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POPULAR Computing WEEKLY

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21 - 27 February 1985

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Vol 4 No 8

Troubled Acorn faces winding-up order

ACORN'S troubles intensified last week with a winding-up order brought against the company by one of its creditors.

Circuit board supplier, Circuit Techniques petitioned for the order because of unpaid bills dating from November last year thought to amount to around £19,000. The order issued by the High Court last Thursday will be served on Acorn in Cambridge this week, with a court hearing set for April 1.

There has still been no announcement by Acorn concerning its future, following the suspension of its shares

trading on February 6.

It is believed that the company together with its new financial advisors Close Brothers, held a meeting with the company's major creditors on Friday February 15.

However, the announcement of the long-awaited rescue plan to save the company has yet to be made.

One possible plan is thought to involve splitting Acorn into four separate companies dealing, respectively, with research and development, and the home computer business and education markets.



LET Show news-page 4

Profits let down for CBM as UK manager goes

COMMODORE has hit trouble with dismal financial results for the six month period to December 31 1984 and the resignation of its UK General Manager, Howard Stanworth.

last week with the departure of Howard Stanworth.

"He tendered his resignation during a meeting last week with Commodore's US president and chief executive, Marshall Smith," said a spokesman for the company. "His parting is amicable on both sides."

So far, no replacement has been appointed. Arthur Scott, Commodore UK's company secretary, is at present acting General Manager.



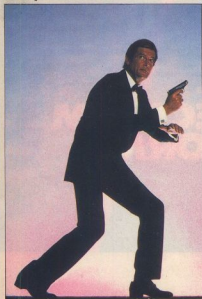
UK General Manager, Howard Stanworth

Net sales for the six-month were down, compared with 1983, from \$640,700 to \$582,900 and profits came down to less than half from \$74,400 to only \$30,900. Commodore's chairman Irving Gould blamed the strength of the dollar and said, "Fiscal 1985, which ends June 30 is clearly a transitional period for Commodore."

In the UK, the post-Christmas staffing shake-out at Commodore UK continued

DOMARK has licensed the computer game rights for the next James Bond film, *From a View to a Kill*.

The programming is being done by Softstone, a company whose staff include ex-Ultimate programmers. When finished, the game will centre around arcade screens based closely on stunts used in the film in which
cont on p4 ►



INSIDE

DK'TRONICS AMSTRAD SOUND REVIEW

**FREE
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As we go to press there is still no announcement from Acorn – the UK's second biggest micro manufacturer – concerning its future, following the suspension of its shares two weeks ago. The only news has been bad – Circuit Techniques' winding-up order.

The longer Acorn remains in this state of limbo the less likely it is that the company will emerge largely intact.

One suggestion has been that Acorn should split into separate companies dealing with, respectively, the home, business and education markets. The fear is that Acorn's diversification out of the education sector – which accounts for over 60% of the company's turn-over – may have come too late. In the home market the Electron has not done well and a replacement for the BBC is needed. In the business market the ABC range is over-ambitious – even though Acorn's IBM-compatible offering is, from a technical stand point, a strong contender.

Acorn must look for example to Atari. Twelve months ago Atari was where Acorn is now – only being bigger it had further to fall. It was losing \$800m a year and its main product, the 800XL, like the BBC, was past its prime.

Jack Tramiel, the new Atari boss, in just a few months wielded the axe, trimming Atari to a sixth of its size at 250 half the size of Acorn – and its new ST machine is generating a great deal of excitement.

Can Acorn effect a similar turn-round? Under the control of Curry and Hauser, I'm not so sure. Acorn is the company they built up together from nothing and they are too close to it to be objective – especially when the cuts may need to be savage.

POPULAR Computing WEEKLY

Vol 4 No 8

Presents...

News > LET show news

Software Reviews > *Upper Gumtree* on the CBM 64 > *Spectrum Kung Fu* from Bug Byte

Hardware Review > Tony Kendle converses with the DK'Tronics Speech Synthesiser for the CPC 464

Streetlife > Graham Taylor – flowchart in hand – visits the interactive video company, Epic

Stargame > Cue up the keyboard for Snooker Strategy on the CBM 64 by Steve McCarthy

Spectrum > Extend your Basic with this m/c program by Robert Kirkland

Amstrad > Arrays and Sorts explained on the CPC 464 by Geoff Baldwin

1984 Popular Index > No more wading through the back issues – Volume 3 presented in glorious alphabetical order

The QL Page > No more microdrive blues – John Rainbow shows how to put your QL programs on tape

BBC and Electron > Boris Allen printing prettier than ever on the BBC B

Best of the Rest > Letters 6 > Open Forum 36 > Baud Walk 36 > Bookends 38 > Arcade Avenue 39 > Education Report 39 > Adventure Corner 40 > Top 10, Diary, Readers Chart 46 > New Releases 47 > This Week 47 > Puzzle, Ziggurat, Hackers 50

Futures...

Amstrad Star Game – Poker on the CPC 464 > Part Two of Adrian Warman's PBank for the CBM 64

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ABC

56,052 copies sold every week (Jan-June 1984 ABC).

How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here – so please do not be tempted. **Accuracy** Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Computer Trade Association Magazine of the Year

Domark
continued from page 1

the player takes the part of James Bond/Roger Moore. Domark also plans a music backing track for the game.

Initially, versions will be available for the Spectrum, Commodore 64 and Amstrad CPC 484, with an MSX version soon afterward.

With an eye on the US market, Domark is planning later implementations for the IBM PC and Apple II.

The program is expected to cost around the £10 mark.

Competition for Acorn

ACORN, if it survives its present serious problems, will face tough competition in the education market from Apple.

Apple has announced a UK schools discount scheme, called Our Kids Can't Wait, which offers a flat 50% discount on the Apple II model for schools and is accompanied by Summer 'teach-ins' for teachers.

Although Apple holds only around 5% of the UK schools market - compared with Acorn's approximate 60% - the company's aggressive price cutting policies have been a significant factor in Acorn's failure in both the US and Eire schools markets.

In the UK, with the government's half-price micro's in schools scheme at an end, Acorn has had to put together its own discount packages for education.

The emphasis has been placed on schools up-grading from the basic system, rather than buying for the first time. "Introductory offers for schools buying their first micro will give a 20-25% discount, there are various bulk packages of peripherals for schools wishing to up-grade from the basic system, and then complete packages, which vary according to the intended age range, which will carry a 30-40% discount," said an Acorn spokesman.

"For example a BBC B plus Ecomet plus a DFS with a second processor and 800K disc drive would sell for under £1,100 as opposed to the normal cost of around £1,800."

LET Show Report

OVER 200 companies exhibited at the LET micro trade show, held at Olympia in London from February 17-19.

The emphasis at the show was very much on new software products with many companies previewing programs not due out until Easter time.

Addictive Games showed a prototype version of its next game, *Stringer* for the Commodore 64. *Stringer* is an arcade game set in a hotel - the player must search the hotel rooms for items such as a camera and keys, while evading members of the hotel staff.

Gargoyle Games announced its conversion of *Tir Na Nog* for the C64 at £9.95, and also showed screens from its next game, *Dun Darach*. *Dun Darach* (Gaelic for Hill of the oak) features Cuchulainn's early days - Gargoyle's Greg Follis describes it as a *Tir Na Nog* 'prequel'. The game also features around 20 other animated characters with whom Cuchulainn must interact. Playing techniques are otherwise similar to *Tir Na Nog*. *Dun Darach* is set for a May release at £9.95 for the Spectrum and Amstrad CPC484. Gargoyle is also planning to release a program based on Lewis Carroll's *The Hunting of the Snark* in October 1985.

Still on the subject of follow-ups, Palace Software displayed its second program *Cauldron*, an arcade adven-

ture for the C64 and Spectrum at £7.99, which should be available in April or May.

Mikro-Gen's Wally Week character continues in similar vein in *Everyone's a Wally*, which also features people such as Wally's wife, Wilma, and son Herbert.

Llamasoft previewed *Mama*



Llama, Jeff Minter's latest hairy animal shoot-em-up.

Firebird showed the second of its 'Gold edition' games, *Buggy Blast*, Gremlin Graphics announced *Safebreaker*, and Argus had *Give My Regards to Broad Street*, based on the film of the same name and part of Argus's Mind Games series, up and running. Bug-Byte was showing the long-awaited *Automan* game, licensed from the TV programme.

Activision, hoping to consolidate the runaway success of *Ghostbusters*, launched no fewer than nine new titles, many of which were shown for the first time at CES last month.

Oric offers roll in

SEVERAL offers have already been made to the Oric receiver to buy the assets of the failed micro manufacturer.

Among those under discussion are those from a syndicate set up by ASN, exclusive distributors of the Oric machines in France, and a proposed purchase of assets by Barry Muncaster, a director and joint owner of software house Tansoft.

Muncaster resigned from his positions as managing director of both Oric and Edenspring just days before the receiver was called in at Oric (see *Popular Computing Weekly*, February 7).

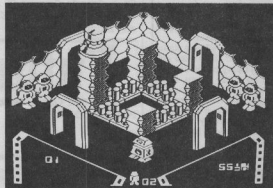
Barry Muncaster will know this week whether his offer has been accepted.

Muncaster has now taken over as head at Tansoft, and Bruce Everiss contract as managing director of Tansoft and marketing consultant for Oric was terminated last week.

"Bruce's role as a marketing consultant for Oric was at an end, and his job complete," said Barry Muncaster.

Commented Everiss: "I could see it coming. When Oric went down, Barry Muncaster came in to run Tansoft, and his style of doing things was very different from mine."

Alien 8 - Ultimate's newest



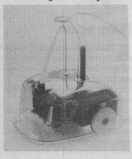
ALIEN 8 is the latest release from Ultimate Play the Game. The graphics and playing techniques are very similar to those of *Knight Lore*. In *Alien 8*, the player controls a robot on a spaceship, who must find a number of keys and use them to activate stores of cryonauts held in suspended animation at locations aboard the craft.

Alien 8, for the Spectrum, costs £9.95. For a more detailed review, see page 47.

New robot from IGR

ZERO 2 is a new low-cost robot which can be interfaced to most home micros.

Developed by Intergalactic Robots (IGR) - a new company formed by computer journalist Robin Bradbeer - it is intended for both home and educational use with any micro offering an RS232 port.



Zero can be programmed from either Basic or, with schools in mind, from Logo any RS232 port. The basic robot, which comes in kit or fully-assembled form, has a two tone horn, a line follower, and a pen which may be

raised or lowered. Additional boards for the machine will add speech, 3-channel sound and obstacle detection.

The kit version of Zero 2 is £19.95 - ready-built it costs £99.95. Software to drive the robot from the Spectrum (with Interface 1) and BBC micros is available now. A Commodore 64 version of the software will follow.

IGR has arranged with Sinclair to have a bundled package of Zero 2 and Sinclair Logo available for £129.95. A similar arrangement has been made for Logotron Logo on the BBC (£149.95, available April).

C128 delay denied

SUGGESTIONS that the UK launch of Commodore's new C128 machine will be delayed until the late Summer have been firmly denied by the company.

Gail Wellington, Commodore's European Software

Development Manager commented: "It's still all on target for the late spring." "The C128 is going through the pilot production stage now, the machine shown at CES being a hand-built engineering model.

"The price for the C128 in the UK will depend on the strength of the dollar over the next few months, and we will not finalise the price until we are ready to go into full production."

Quest for the Fab Four

AN ADVENTURE game based on lyrics from Beatles songs is due out soon, from a company called Number 9 Software.

"The game is closely linked throughout with the songs," said Gary Marsh, who wrote the adventure called *Beatles Quest*.

"For instance, you can visit locations such as Strawberry Fields, Penny Lane and Eleanor Rigby's grave.

"The idea behind the plot is that you are a student of my-

New software for VTX5000

OWNERS of the VTX5000 modem for the Spectrum who wish to access 300 baud non-Prestel format ascii-type bulletin boards can now do so.

Specnet, available on cassette for £5.95, allows VTX5000 owners to communicate control characters to ascii boards and also save and load information from the boards to tape or microdrive.

Details from Stephen Adams, 1 Leswin Road, London N16 01-254 1869.

thology studying the Four Kings of EMI, and you must collect twelve objects of interest and value to help you with your project.

Beatles Quest has been written using the *Quill*, and will initially be sold by mail-order for the Commodore 64, and later the Spectrum and Amstrad, at around £10. Details from Gary Marsh, 47 St George's Avenue West, Wolsanton, Newcastle-under-Lyme.

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LORDS OF MIDNIGHT	9.95 5.95	SOLD FLIGHT	14.95 10.50
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FRANK N STEIN	9.95 6.95	NATO COMMANDER	9.95 7.50
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MATCHPOINT	7.95 6.75	MY CHESS I	11.95 8.25
*SCORABLE	15.95 4.75	QUASIMODO REVENGE	7.95 6.75
EDGE KID JUMP	7.95 4.95	ZAXXON	9.95 7.50
COMBAT LYNX	7.95 5.25	SUMMER GAMES	14.95 10.25
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ZAXXON	7.95 5.95	BREAKER	7.00 4.95
*YU CALE	9.95 4.00	COMBAT LYNX	9.95 6.95
*JACK AND BEANSTALK	5.95 2.75	CAC CAM WARRIOR	9.95 7.25
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*WALKYRIE II	9.95 4.95	IMPOSSIBLE MISSION	8.95 6.75
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Chicken and egg

In a recent editorial you stated that the 68000 was taking over from the Z80 and 6802 processors, and that British software houses were having difficulty in making the transition.

We feel we should point out that the lack of a wide range of software for the Sinclair QL is due almost entirely to the nature and small size of the User Base. For a proficient machine code programmer, learning to use a new Micro-processor takes at most two days. This should not be confused with learning about a new computer to its best advantage, which might take a couple of weeks.

As soon as a computer has achieved or looks like achieving sufficient sales to warrant production of programs then those programs will start to appear in quantity.

Andy Lawrie
Technical Director
Mikro-Gen
23a Station Road
Ashford, Middx

If you assume that software sells micros then what you propose is a circular chicken-and-egg argument - no sales equals no software equals no sales. How then is any new micro to survive?

I still think that the software companies which look set to stick around are the ones which take a more long term view.

Two days to learn a new processor? Mikro-Gen works fast.

A new version

Owners of the Sinclair QL who found my article *Dark Secrets of the QL Rom Revealed* useful may be interested in learning of the release of a new version of the QL Rom - 'JS' - which includes QDOS version 1.10.

In my program, included in Vol 3 No 38, simply alter Line 190 to read *TABULATE* 28194 and change Line 230 to *TABULATE* 28686 to reveal the runtime module addresses for all the keywords in your new Rom. There are 25 new keywords and, of course, all the other keywords have changed address.

COMMAND ROUTINE ADDRESSES

PRINT	30376	RUN	32164	STOP	32266	INPUT	30374
MEMOIN	32638	BORDER	32676	INK	30154	STRIP	30158
PAPER	30162	BLACK	32652	PAN	30196	SCHOLL	30200
CSIITE	26274	FLASH	27564	UNDER	27558	OVER	27566
CORSPR	26210	AT	27490	SCALE	27438	PIBINT	27456
LINE	27674	ELLIPSE	27674	CIRCLE	27416	ARC	27778
POINT_R	27640	TURN	32408	TURNOID	32440	PCUP	32464
PENDOWN	32470	MOVE	32484	LIST	29624	OPEN	27444
CLOSE	27430	FORMAT	27252	COPY	27278	COPY_W	27282
DELETE	27110	DIR	27116	EXEC	26784	EXEC_W	26788
LBYES	26884	SEEC	26940	SBYTES	26944	SAVE	27500
MERGE	32292	MROIN	32212	LOAD	32244	LRUN	32250
NEW	32262	CLEAR	32152	OPEN_IN	27468	OPEN_NEW	27472
CLS	30192	CHL	30198	RECOL	31436	HANDWRITE	31128
PAUSE	30280	POKE	30314	PONK_W	30324	POKE_L	30330
BAUD	25924	HELP	25984	CONTINUE	32324	RETRY	32324
NEAR	26718	NET	30126	MODE	30096	MEMOIN	31524
BLINE	26794	SWATE	26524	ADATE	26504	LINE_B	27678
ELLIPSE_R	27702	CIRCLE_R	27702	ARC_R	27782	AUTO	31482
EXIT	31478	FILL	27528	WIDTH	32616	REPORT	32120
TBA	32344						

FUNCTION ROUTINE ADDRESSES

ACOS	32852	ACOT	32958	ASIN	32864	ATAN	32870
COS	32874	COT	32882	EXP	32888	LN	32894
LOG10	32900	SIN	32966	SORT	32912	TAN	32918
DEG	32924	RAD	32920	RND	33002	INT	33108
ABS	32962	PI	33040	PEEK	33132	PEEK_W	33140
PEEK_L	33150	RESPP	33186	EOF	33224	INKEY	33294
CHR	33382	CODE	33502	KEYROW	33446	DEEPLIN	33206
LEN	33480	DIM	33542	DAT1	33722	DATE	33422
DATEF	33714	FILL	33400	VER	33266	ERR_IC	33806
ERR_IC	33864	ERR_ON	33802	ERR_OR	33802	ERR_BO	33806
ERR_BO	33798	ERR_WF	33796	ERR_EI	33794	ERR_LU	33792
ERR_FF	33796	ERR_SF	33780	ERR_RN	33784	ERR_TE	33784
ERR_FF	33782	ERR_BP	33780	ERR_FE	33778	ERR_IP	33776
ERR_OV	33774	ERR_NI	33772	ERR_BO	33770	ERR_AL	33768
ERRUM	33882	ERRLN	33896				

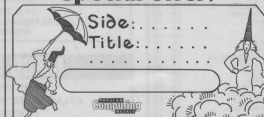
The accompanying figure is an example print-out from the suitably modified program.

I hope this proves of use and interest to new 'JS' owners, like myself, and envious QL users still stuck with 'JM'

and even 'AH' versions as I was until my machine was given a retrospective upgrade whilst being repaired.

Alan Turnbull
Vicarage Road
Cale Green
Stockport

Free cassette labels special offer!



Wow! Fifteen of these attractive self-adhesive *Popular Computing Weekly* cassette labels are yours if you fill in the coupon below and sent it off to *Cassette Labels Offer, Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 1PP, by 15 March 1985.

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Think again

Although I realise it must be very annoying for top programmers to see their latest program pirated, isn't it time that the so-called 'turbo-load' was stopped?

It's all very well stopping people from copying by putting on an anti-piracy device, but when it gets to the point when even the originals don't load surely it is time to think again.

A Woods
Andover

Old and obsolete

People should think twice before throwing out their old calculators and microcomputers.

Today's radios, calculators and especially computers will, I'm sure become tomorrow's collector's items - worth perhaps huge sums of money. In the future, people will then be able to look back and marvel at the antiquity of our present day technology.

I have now started to build up my own collection of old and obsolete microcomputers which can be picked up now for practically nothing, often in pristine condition.

Robert Sedgwick
Walsham
Grimshy

More C16 reviews

I think your comments regarding the lack of C16 software (February 7 issue) are quite justified.

My husband and I are building up a collection of C16 games and have 12 titles already, with another ten we want to buy.

Please stop saying there is a shortage of software and lets have a few more C16 program reviews.

Yvonne Thorpe
Essex

A Tony Crowther/Quicksilver Production

GRYPHON



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synthesise many musical instruments, even

create your own 'synth' electronic sounds, choose between monophonic or polyphonic play, summon up pre-programmed rhythms and bass accompaniments, and more.

Music Maker is the first in a series of packages which will fully exploit the Commodore 64's outstanding musical capabilities.

On disk or cassette, with music keyboard, a clear and concise manual, and song book, for just £29.95.

SPIRIT OF THE STONES

It's a treasure hunt for 41 real diamonds hidden somewhere on the Isle of Wight.

Only one man knows where they are, and he's not saying.

All that he has to say he's said already -



GOLD IF YOU YOU H

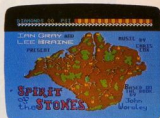
but in the form of riddles, clues and puzzles.

Solve the puzzles in the Spirit of the Stones program and you'll find it much easier to solve the puzzles in the Spirit of the Stones book.

Solve the puzzles in the book and one (or more) of the diamonds can be yours.

Whoever discovers a diamond can also claim his or her share of the Royalty Fund, which could grow to a maximum of £1 million. It's a game that's as entertaining as it can be rewarding.

On cassette or disk, £14.99.



INTERNATIONAL FOOTBALL

Already it's recognised as the best football game ever seen outside of Wembley. It's startlingly life-like, and gives you near perfect control of the players.

You can kick the ball, dribble it, pass it,

MEDALLION. HAVEN'T GOT IT AVEN'T GOT IT.

head it or even throw it in from the touch-line. And every time you belt the ball into the net, the crowd cheer wildly.



How often you score depends on how good you are, and also at what level you choose to play.

There are 9 levels you can play against the computer. Or you can play a friend.

International Football is a real test of skill, dexterity and speed. It is certain to drive you football crazy.

On cartridge, £14.99.

JACK ATTACK

There's no other game like it. It has been voted by the U.S. magazine 'Electronic Games Hotline' as a 'must buy'.

Jack Attack is about squashing heads. It's an

addictive game, a game of strategy and cunning. We can almost guarantee it will turn you into a head-case.

To stay alive, Jack must leap aside from collapsing bridges and crashing blocks, and at the same time he must



make sure he doesn't fall into the water... and drown.

And that's the easy bit. Because everywhere Jack goes he's dogged by jolly bouncing sadistic heads that are out to nut him.

He has to squash their heads before his is squashed.

And Jack can't afford to lose his head because we've only given him three, and when they've gone, he's gone...

Jack Attack is available for both the Commodore 16 and Plus/4. On cartridge £14.99.



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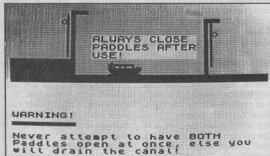
Reasoning

Program Lock Keeper Price £4.95 Micro Spectrum 48K Supplier Deva Educational Software, 33 Upton Drive, Chester CH2 1BY

Does this educational program indicate that Deva expects a great revival in canal travel? Not really, but it uses the processes involved in operating a lock to encourage reasoning and ordering skills. For example, if you open both gates

option of the tutor program or the tests. The former runs through the procedures of lock keeping in a friendly fashion, with animate illustrations. Once the child understands this, the tests present six different situations and a menu to conduct them.

A percentage score follows each test and the inputs are well idiot-proofed, but in the end it is worthy rather than exciting. Perhaps if the tests could be replaced by a simulated journey with a race against time it would be more appealing, but sadly the educational software market is



the water flows straight through and you drain the canal.

While the theory behind this program seems sound enough, the implementation is unlikely to hold the attention of the average ten year old. The title screen gives the

seldom able to develop sophisticated offerings owing to its scale. A small company has put some hard work into this program but the end result lacks flair.

John Minson



Pot luck

Program Steve Davis Snooker Micro CPC 464 Price £7.95 Supplier CDS Micro Systems, Silver House, Silver Street, Doncaster, South Yorkshire DN1 1HL

After all the fuss I made about how Amsoft's Snooker will compare to this version I am now in a position to say and the first point to make is that where Amsoft's game was too slow and difficult, this one is very very fast. I'm sure it's also easier (because the pockets are bigger). I found it much more enjoyable to play, and the pace certainly suits my temperament.

Unfortunately, there are one or two drawbacks to the CDS game that cloud the issue. Firstly, and less impor-

tantly, the CDS game has far less attention to detail with nowhere near as attractive on-screen scoring for instance. More crucial, though, is the fact that CDS appear to have given no consideration at all to the owners of the green screen monitor - not only did the Amsoft program allow the colours to be numbered on screen, but as you moved the cursor over a ball there was a message telling you which colour it was. CDS seem content to let you take pot luck (get it?) forcing you to nominate a colour before you line up the cursor.

In practice, the various colours are very difficult to distinguish in monochrome and many foul shots result. This may drive a significant proportion of potential buyers to the Amsoft game.

Tony Kendle



Deflated

Program Guzzler Micro Commodore 64 Price £7.95 Supplier Interceptor Micros, Lindon House, The Green, Tadley, Hants

This is another of those ridiculous maze games, with funny characters and hundreds of different screens. Don't get me wrong, some people will love Guzzler.

Your are a mouse and, as mice are always hungry, it is your job to find food. The food is placed in various locked rooms around the maze, and you have to get a key to gain access, before you get to eat it. You must also avoid the meandering

Frobbers, who are far more keen on eating you. After eating the food in one section, the mouse becomes fat and has to be guided to the edge of the maze to be deflated by Deflator Dennis.

Sometimes, when the going gets tough, you even need to use time bombs (ever seen a mouse carrying a time bomb? No, neither have I). If things are going well, Bonus Barry appears and can be caught for extra points.

Although Guzzler is quite fun to play, I feel that it lacks that original spark. If you haven't already got a maze game in your collection, then I suppose you could do worse than shell out for this one.

Tom Hussey



Martial art

Program Kung Fu Price £8.95 Micro Spectrum 48K Supplier Bug Byte Software, 99-100 The Albany, Old Hall St, Liverpool, L3 9EP

I loaded this program with trepidation, not that it would kick the keys from my Spectrum, but that it would be the silliest sport simulation yet. After all, what is Kung Fu without physical exertion, bones crunching and cries of 'Argh'?

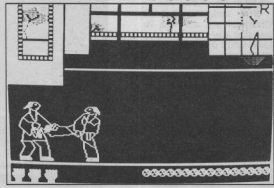
Sixty minutes later I was hooked. Backed by an incessant oriental tune my fighter, a full third of the screen tall and superbly animated, moved back and forth, trying to topple his computer operated opponent. With just two hand blows and two kicks he blocked, hesitated, found an

opportunity and struck. The opponent toppled and I gained my yellow belt.

To confirm my impression that the moves are accurately reproduced I left the arcade game and invited a karate green belt friend round to fight me on the two player option. She recognised the blows immediately and proceeded to deliver a nifty kick to the head of my man. Beginner's luck, or had her martial arts expertise actually helped?

Possibly only four moves will limit the program's life, but then again the one and two player options are quite different games, and the timing and precision needed are every bit as exacting as in arcade adventures. Forget the doubts; all I have to say is... Hail-ee-ahh!

John Minson



Powerful

Program *Arnor 280 Assembler, Disassembler and Editor* Price £13.50 **Micro** CPC 464 **Supplier** Arnor Ltd. P.O. Box 619, London SE25 6JL.

Any program that called itself an assembler should be able to perform the same basic function - converting assembler to machine code. However the things that separate one version from another are the supporting utilities, the flexibility, and the ease of use, and this attempt by Arnor is easily the best that I have seen in those respects. It features a menu driven by disassembler and a memory lister in addition to the main editor and assembler, but the latter two are certainly the most important features. Each part can be loaded or omitted independently so that full use is made of the memory.

The assembler itself has many excellent features - allowing identifiers of any length and almost any form including the use of directives and mnemonics as labels, and allowing conditional assembly via nested *If*, *Else* and *Endif* so that the object code differs in response to variables such as available memory. The as-

sembler is two pass and different messages can be caused to appear on each pass and you are also given extensive control over the screen and printed output with various commands.

However, it really comes into its own by allowing mixing of assembler and Basic - the utility can reside in memory above your program and assembler language can be entered as lines of Basic, assembled using commands provided as system extensions and run from any point in the program without affecting basic variable storage. Provision is made for full parameter passing between the two languages.

The editor allows full screen editing with excellent cursor control, delete and insert functions and block loading, saving and printing. Although it has been designed to be used with the assembler, it can be used as a powerful editor for text and basic files saved in ASCII format - a truly superb feature that illustrates the care that has gone into this program. The documentation is good enough for most people's use and the company promise more utilities of a similar quality if this one does well - let's hope it does.



Tony Kendle

worked individuals with silly names (sorry, all Mertons out there). He runs and jumps in an effort to stop balloons filling themselves at taps, meta-

Repellent

Program *Upper Gumtree* Price £8.95 **Micro** Commodore 64 **Supplier** Richard Shepherd Software, Eton House, 23-25 Elmshott Lane, Slough.

First we had the grimly hysterical world of *Urban Upstart* and now, once again courtesy of Richard Shepherd software, come the horrors of *Upper Gumtree*, the town where beans on toast used to be a big event. But that, of course, was before the Mad Professor arrived. Now nobody can call Upper Gumtree boring. Weird, potentially lethal and frequently repellent, yes. Boring, no.

The Prof is, naturally, after World domination and for some reason (well, he *is* mad) has picked UG as his base. Now sinister shapes patrol the night skies, the noses of the citizenry glow in the dark and Tuesdays have vanished completely. The Prof has a plot, but what can it be?

In quest of the answer I

found myself in a peaceful country lane with what I foolishly assumed to be two trusty companions, Emma and Wally. Emma's OK, but after being left to bleed to death in the first minute by an abusive Wally, I began to wonder about keeping company with a kleptomaniac.

Each route, once I had solved the initial problem, led to further danger including a murderous farmer, a fast-moving and extraordinarily persistent bull, rabid dogs and the very nasty effects of attempting to take refreshment in UG. Most locations start with a rapid illustration which then gives way to text and, in a nice touch, you can alter the text colours to your preference. And descriptions are often amusing, not least the "obligatory wood".

I found this more fun than *Upstart* and also more of a challenge. I still haven't figured out the plot, but now I've managed to distract the guard dogs. The Prof's megalomaniac days may be numbered.

Barbara Conway



morphosing into deadly toys, then returning to their original state of balloonatic bliss (an unusual life-cycle here, unknown even to O-level biologists) There's also Hefty Hilda, the roving menace, and Piston Platforms which propel anything on them upwards. Inevitably, each successive screen is more difficult than the last.

This can be enjoyable for a while as the screen fills and you race against time, but the program lacks finesse. The screen is soon full, luck plays too great a part and the graphics are nothing special.

All in all, a stocking filler at a great present price.

John Minson



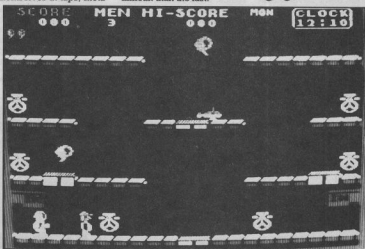
Deadly toys

Program *Toy Bizarre* **Micro** Spectrum 48K Price £7.99 **Supplier** Activision UK, 15 Harley House, Marylebone Road, London NW1.

With its bright red cover *Toy Bizarre* looks like a belated Christmas gift, and with its standard size cassette box it looks unlike previous lavishly produced Activision products.

The game itself unfortunately, considering its £7.99 price tag, wouldn't look out of place in a budget range.

Not that *Toy Bizarre* is bad - it just seems to come from One Million Years B.W. (Before Willie). It's a platform game set in a toy factory after midnight, with Merton as the latest in a long line of over-





The writing's on the wall...

The introduction of MSX Basic has quite simply revolutionized the use of home computers. From today most of the languages in common use will fade into the brickwork.

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Spoken word

Hardware Amstrad **Speech Synthesiser plus stereo Micro CPC 464** **Price** £39.95 **Supplier** DK'Tronics Ltd, Unit 6, Shire Hill Industrial Estate, Saffron Walden, Essex.

I must confess that I've never been one to be greatly seduced by the appeal of computer speech, nor, having been used to the Spectrum's weedy bleeps, did I regard the CPC 464 as a machine that requires external amplification as a high priority. However, there can be no question that speech synthesisers, if they can sell in sufficient numbers to encourage software support, are popular peripherals and it is certainly nice to be able to hear the stereo effect of the sound channels without the rigmarole of plugging in the hi-fi, which always struck me as a retrograde step from the remarkable simplicity of the all-in-one single plug 464.

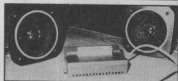
The package consists of two quite neat 'pod mounted' car speakers which connect to a small box, finished to match exactly with the main computer except for the DK'Tronics logo. This plugs snugly into the floppy disc edge connector and also sends a wire to the stereo sound output socket, together with a built-in

extension bus to allow further external peripherals to be plugged in. Fitting should be simple, involving just slotting the thing into the back.

However, the first try revealed an unsuspected fault in my computer - if you inspect the floppy disc edge connector you will see that it in fact consists of two halves separated by a slot, presumably to ensure that you don't plug things in upside down. On my machine this slot is self-evidently smaller than it should be and I could not get the speech box to fit without damaging the corresponding ridge on the interface. Having struggled for almost half an hour to sort this out I am now dreading having to remove the interface.

In place it acts as a permanent amplifier and stereo output for commercial games etc. It gains all its power from the computer and does not interfere with the inbuilt sound output if you choose to disconnect the speakers.

The speech part of the interface can be accessed from Basic or machine code at any time by sending the appropriate allelephone data to the out channel concerned. To help you do this there is a table of words showing their composition in allelephones. You can also control the speed at which the speech is output. Sound quality is appropriately robotic and bland but reasonably clear. However, once the accompanying, relocatable,



5K of software is loaded then the thing comes into its own. You are given eight new Basic commands for controlling the speech output and, as well as allelephones, you can now employ 'text to speech conversion' wherein you can direct a message that would normally be printed to any channel to be spoken.

Within minutes the big kids in our house had the 464 saying all sorts of outrageous things to the accompaniment of much hilarity and I can confirm that this system seemed to work even better than the allelephone method. I trust that there will be no problems from DK'Tronics about software copyright if people choose to include this in their own Basic programs. The speech commands are interrupt driven and there is a built-in buffer that holds some 45 seconds of speech.

In all this is a fun package that whilst appearing a bit frivolous in some ways, has been well implemented and has enough good features to make it worth the money.

Tony Kendle

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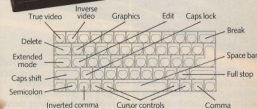
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Epic proportions

Graham Taylor goes in search of interactive video and finds it in unexpected places.

Interactive video, it seems, is almost here, but then it has been almost here for several years now. It was almost here when the first Laserdisc arrived. It was even more almost here when *Dragon's Lair* didn't much wow them in the arcade.

Actually the truth is that interactive video has been around for ages, three or four years, in fact, and has reached a surprising degree of sophistication. Video images and narrative sequences can be freely mixed with computer graphics, scrolled, dissolved, mixed, matched and retrieved from Laserdisc in seconds. The equipment involved is largely standardised and relatively simple.

Epic is probably the biggest interactive video company in the country, one of the biggest in the world, but you won't find its product in the arcades or on sale in your local computer store. The chances are that you won't see its work at all, because interactive video has stopped being almost here and is instead wowing them in the wonderful world of industrial communications, more specifically, training material and point of sale information.

Head of the interactive video department at Epic is Mike Huddart and I talked to him about his work. "It began when Eric Parslow, the founder of the company, saw the system at work in America. Epic was already involved in ordinary training videos and he saw how the system could be used to improve that process immeasurably."

Over the years Epic has produced a system for IBM to help them inform their dealers about ranges, a system for Rolls Royce to help its trainees and workers learn how to assemble and inspect aero engines, EETPU, the engineering union

has a system which introduces traditionally trained workers to the mysteries of solid state physics, and the Manpower Services Commission is installing a system of interactive video into 42 special information points within selected Job Centres.

Mike described the ideas behind this last project. "It is intended to help people visiting the Job Centre find out more about the services at a basic level - so that they know what kind of things the staff can help them with." There are also technical reasons why the Job Centre project is interesting: "The Manpower Services Commission is using it as a test for the two main rival systems - the Phillips Laservision and the Thorn UHD (ultra high density)."

Nearly all of Epic's work is based on one of these two systems at the disc end. I asked Mike about the systems. "The laserdisc can contain up to 37 minutes of continuous film sequence or 54,000 individual still frames. The Thorn system can have over an hour's worth of film or 30,000 frames."

Wasn't 37 minutes a very short time limit? "Actually no, we can make use of that 37 minutes of film sequence, so that the EETPU course, for example, lasts four days. It's a matter of careful design - after all, in an instruction video there are going to be sections where you simply require someone to read a screenful of text, which means one still image can use up a minute or so of time."

The computer end of the system is, within limits, not too important. Epic has utilised the IBM PC and the BBC amongst others. "We use a BBC on the EETPU project and it's perfectly adequate - the advantage of the BBC is that its signal is highly suitable for TV."

As you might imagine the process of

making an interactive video is fairly complex and time consuming. "In a typical piece there might be 40-80 major branch points and many more lesser ones where different sequences of computer graphics, text, video images may be required. Each piece has to be originated: programming has to be worked out, computer graphics prepared, still shots have to be professionally taken and filmed sequences recorded."

"You need a multidisciplinary team - in the case of a training video you need an expert on the subject. You must work out, in consultation with the client, the aims and objectives of the work and how to best put it over. You need audio-visual specialists who can create strong images and who know how to use effects like dissolves, and you need systems analysts who work in a more disciplined way in using computer systems correctly. At the very least it's a computer team plus a video team. Finally you need a project leader who can pull together the two disciplines."

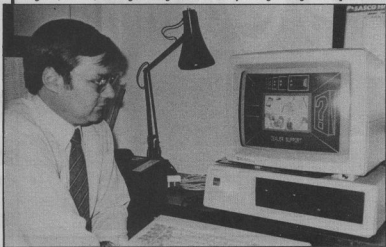
Actually, looking at Epic's work it becomes apparent just how sophisticated the system has already become.

A piece is being developed for IBM which uses a touch screen television - different sections of the TV screen producing different results: one part accesses help information, another lets you look at traditional information on each subject, and so on.

The idea is that the end result will be available for IBM dealers for use in the showrooms. "There are quite a few places where videos are shown to interest customers in products and services, but who looks at them? With this system people can choose the sections they are most interested in."

The end result is an impressive mixture of scrolling film screens with computer graphics. Whatever you think of IBM, you find yourself playing with the system and wanting to see more. "Sometimes we have to explain to our clients that the system is capable of far more than simply chopping up bits of tape and accessing them quickly."

"For example, the IBM program does more. Even that shows a sophisticated advert where you decide what products you want to know more about. Every time a section is kept by the computer and filed appropriately it means that the dealer can know exactly what products his customers are most interested in." Technology for video interaction is largely with us, but Mike sees the main problems as those of human skill. "I would say that, certainly for Epic's purposes, the technology is more or less with us for most things we want to do. It's more a matter of acquiring the skills and techniques to use it properly and effectively. There can be a tendency to make the whole thing more sophisticated and complex than it needs to be. We have to remember what the end result is supposed to be."



Snooker Strategy

Straighten that bow-tie as you type in this Snooker Strategy program for the CBM64 by Steve McCarthy

Ever thought of yourself as a budding Steve Davis? Or maybe cutting a more debonair stride as a Cliff Thorburn? The trouble is that you don't know which end of a cue to grab hold of and it's difficult to fit a billiard table into

the box room. However, these problems are solved with Snooker Strategy, a two-player game for the Commodore 64.

Sitting back in your chair, you select the ball to be potted - none of this straining over the green baize business - as you

build up your break, or play a sneaky one to snooker your opponent. ... What's more, you don't have to wear a dinner suit.

Type it in, and remember ... we all had to start somewhere. Now where did I put that chalk. ...

```
10 POKES3200,5:POKES3201,5:HB0=0:DIMFV(1):
R0=INT(RND*(11)):GOSUB14000
15 DIMFV(6),SC(1),BC(1),D(6),E(1)
16 REM CLR SCREEN,RVS ON,GRAY 1,RVS OFF
20 PRINT"7",TAB(3)"THE COMMODORE 64 SNOOKER TOURNAMENT"
30 GOSUB1000
34 REM HOME,4*CRSR DOWN,ORANGE
35 PRINT"*****"
39 REM RVS ON,WHITE,RVS OFF,CYAN,GRAY 1,RVS ON,WHITE,RVS OFF
40 PRINT"2",PLAYER 1,FV=FRAMES:PLAYER 2:"
44 REM BLUE,YELLOW,GRAY,BLUE,RED
45 PRINT"2 SCORE: "BREAK:
# BREAK SCORE:1 PRINTTAB(11)"HIGHEST BRK
K:"
49 REM ORANGE
50 GOSUB1500:PRINT"2"
60 GOSUB1510:GOSUB1520:GOSUB1530
99 REM HOME,5*CRSR DOWN,BLACK,RVS ON,WHITE,RVS OFF
100 IF#THENPRINT"*****"PLAYER 1:TAB(72)"2"PLAYER 2:"GOTO120
109 REM HOME,5*CRSR DOWN,GRAY,ON,WHITE,RVS OFF,BLACK
110 PRINT"*****"PLAYER 1:TAB(72)"2"PLAYER 2"
119 REM HOME,5*CRSR DOWN,GRAY 2,
120 PRINT"*****"PRESS A KEY (1-9) TO SELECT OBJECT BALL."
129 REM HOME,11*CRSR DOWN,BLACK
130 PRINT"*****"RED, 2-7*COLOUR, 8*PLAY A SNOOKER,
9*PLAY OUT OF SNOOKER"
150 GET# :IF#<1:OR#>9:THEN150
159 REM HOME,9*CRSR DOWN
160 PRINT"*****",FOR#1TO4:PRINT#;:NEXT
163 REM HOME,18*CRSR DOWN:HOME,22*CRSR DOWN
164 PRINT"*****"C#
165 PRINT"*****"C#
167 IF#<1:AND#<8:THEN1600
168 IF#<8:AND#<15:AND#<21:AND#<28:AND#<35:AND#<42:AND#<49:AND#<56:AND#<63:AND#<70:AND#<77:AND#<84:AND#<91:AND#<98:AND#<105:AND#<112:AND#<119:AND#<126:AND#<133:AND#<140:AND#<147:AND#<154:AND#<161:AND#<168:AND#<175:AND#<182:AND#<189:AND#<196:AND#<203:AND#<210:AND#<217:AND#<224:AND#<231:AND#<238:AND#<245:AND#<252:AND#<259:AND#<266:AND#<273:AND#<280:AND#<287:AND#<294:AND#<301:AND#<308:AND#<315:AND#<322:AND#<329:AND#<336:AND#<343:AND#<350:AND#<357:AND#<364:AND#<371:AND#<378:AND#<385:AND#<392:AND#<399:AND#<406:AND#<413:AND#<420:AND#<427:AND#<434:AND#<441:AND#<448:AND#<455:AND#<462:AND#<469:AND#<476:AND#<483:AND#<490:AND#<497:AND#<504:AND#<511:AND#<518:AND#<525:AND#<532:AND#<539:AND#<546:AND#<553:AND#<560:AND#<567:AND#<574:AND#<581:AND#<588:AND#<595:AND#<602:AND#<609:AND#<616:AND#<623:AND#<630:AND#<637:AND#<644:AND#<651:AND#<658:AND#<665:AND#<672:AND#<679:AND#<686:AND#<693:AND#<700:AND#<707:AND#<714:AND#<721:AND#<728:AND#<735:AND#<742:AND#<749:AND#<756:AND#<763:AND#<770:AND#<777:AND#<784:AND#<791:AND#<798:AND#<805:AND#<812:AND#<819:AND#<826:AND#<833:AND#<840:AND#<847:AND#<854:AND#<861:AND#<868:AND#<875:AND#<882:AND#<889:AND#<896:AND#<903:AND#<910:AND#<917:AND#<924:AND#<931:AND#<938:AND#<945:AND#<952:AND#<959:AND#<966:AND#<973:AND#<980:AND#<987:AND#<994:AND#<1001:AND#<1008:AND#<1015:AND#<1022:AND#<1029:AND#<1036:AND#<1043:AND#<1050:AND#<1057:AND#<1064:AND#<1071:AND#<1078:AND#<1085:AND#<1092:AND#<1099:AND#<1106:AND#<1113:AND#<1120:AND#<1127:AND#<1134:AND#<1141:AND#<1148:AND#<1155:AND#<1162:AND#<1169:AND#<1176:AND#<1183:AND#<1190:AND#<1197:AND#<1204:AND#<1211:AND#<1218:AND#<1225:AND#<1232:AND#<1239:AND#<1246:AND#<1253:AND#<1260:AND#<1267:AND#<1274:AND#<1281:AND#<1288:AND#<1295:AND#<1302:AND#<1309:AND#<1316:AND#<1323:AND#<1330:AND#<1337:AND#<1344:AND#<1351:AND#<1358:AND#<1365:AND#<1372:AND#<1379:AND#<1386:AND#<1393:AND#<1400:AND#<1407:AND#<1414:AND#<1421:AND#<1428:AND#<1435:AND#<1442:AND#<1449:AND#<1456:AND#<1463:AND#<1470:AND#<1477:AND#<1484:AND#<1491:AND#<1498:AND#<1505:AND#<1512:AND#<1519:AND#<1526:AND#<1533:AND#<1540:AND#<1547:AND#<1554:AND#<1561:AND#<1568:AND#<1575:AND#<1582:AND#<1589:AND#<1596:AND#<1603:AND#<1610:AND#<1617:AND#<1624:AND#<1631:AND#<1638:AND#<1645:AND#<1652:AND#<1659:AND#<1666:AND#<1673:AND#<1680:AND#<1687:AND#<1694:AND#<1701:AND#<1708:AND#<1715:AND#<1722:AND#<1729:AND#<1736:AND#<1743:AND#<1750:AND#<1757:AND#<1764:AND#<1771:AND#<1778:AND#<1785:AND#<1792:AND#<1799:AND#<1806:AND#<1813:AND#<1820:AND#<1827:AND#<1834:AND#<1841:AND#<1848:AND#<1855:AND#<1862:AND#<1869:AND#<1876:AND#<1883:AND#<1890:AND#<1897:AND#<1904:AND#<1911:AND#<1918:AND#<1925:AND#<1932:AND#<1939:AND#<1946:AND#<1953:AND#<1960:AND#<1967:AND#<1974:AND#<1981:AND#<1988:AND#<1995:AND#<2002:AND#<2009:AND#<2016:AND#<2023:AND#<2030:AND#<2037:AND#<2044:AND#<2051:AND#<2058:AND#<2065:AND#<2072:AND#<2079:AND#<2086:AND#<2093:AND#<2100:AND#<2107:AND#<2114:AND#<2121:AND#<2128:AND#<2135:AND#<2142:AND#<2149:AND#<2156:AND#<2163:AND#<2170:AND#<2177:AND#<2184:AND#<2191:AND#<2198:AND#<2205:AND#<2212:AND#<2219:AND#<2226:AND#<2233:AND#<2240:AND#<2247:AND#<2254:AND#<2261:AND#<2268:AND#<2275:AND#<2282:AND#<2289:AND#<2296:AND#<2303:AND#<2310:AND#<2317:AND#<2324:AND#<2331:AND#<2338:AND#<2345:AND#<2352:AND#<2359:AND#<2366:AND#<2373:AND#<2380:AND#<2387:AND#<2394:AND#<2401:AND#<2408:AND#<2415:AND#<2422:AND#<2429:AND#<2436:AND#<2443:AND#<2450:AND#<2457:AND#<2464:AND#<2471:AND#<2478:AND#<2485:AND#<2492:AND#<2499:AND#<2506:AND#<2513:AND#<2520:AND#<2527:AND#<2534:AND#<2541:AND#<2548:AND#<2555:AND#<2562:AND#<2569:AND#<2576:AND#<2583:AND#<2590:AND#<2597:AND#<2604:AND#<2611:AND#<2618:AND#<2625:AND#<2632:AND#<2639:AND#<2646:AND#<2653:AND#<2660:AND#<2667:AND#<2674:AND#<2681:AND#<2688:AND#<2695:AND#<2702:AND#<2709:AND#<2716:AND#<2723:AND#<2730:AND#<2737:AND#<2744:AND#<2751:AND#<2758:AND#<2765:AND#<2772:AND#<2779:AND#<2786:AND#<2793:AND#<2800:AND#<2807:AND#<2814:AND#<2821:AND#<2828:AND#<2835:AND#<2842:AND#<2849:AND#<2856:AND#<2863:AND#<2870:AND#<2877:AND#<2884:AND#<2891:AND#<2898:AND#<2905:AND#<2912:AND#<2919:AND#<2926:AND#<2933:AND#<2940:AND#<2947:AND#<2954:AND#<2961:AND#<2968:AND#<2975:AND#<2982:AND#<2989:AND#<2996:AND#<3003:AND#<3010:AND#<3017:AND#<3024:AND#<3031:AND#<3038:AND#<3045:AND#<3052:AND#<3059:AND#<3066:AND#<3073:AND#<3080:AND#<3087:AND#<3094:AND#<3101:AND#<3108:AND#<3115:AND#<3122:AND#<3129:AND#<3136:AND#<3143:AND#<3150:AND#<3157:AND#<3164:AND#<3171:AND#<3178:AND#<3185:AND#<3192:AND#<3199:AND#<3206:AND#<3213:AND#<3220:AND#<3227:AND#<3234:AND#<3241:AND#<3248:AND#<3255:AND#<3262:AND#<3269:AND#<3276:AND#<3283:AND#<3290:AND#<3297:AND#<3304:AND#<3311:AND#<3318:AND#<3325:AND#<3332:AND#<3339:AND#<3346:AND#<3353:AND#<3360:AND#<3367:AND#<3374:AND#<3381:AND#<3388:AND#<3395:AND#<3402:AND#<3409:AND#<3416:AND#<3423:AND#<3430:AND#<3437:AND#<3444:AND#<3451:AND#<3458:AND#<3465:AND#<3472:AND#<3479:AND#<3486:AND#<3493:AND#<3500:AND#<3507:AND#<3514:AND#<3521:AND#<3528:AND#<3535:AND#<3542:AND#<3549:AND#<3556:AND#<3563:AND#<3570:AND#<3577:AND#<3584:AND#<3591:AND#<3598:AND#<3605:AND#<361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At your command

Extend your repertoire of Basic commands with this program
by Robert Kirkland

This program adds 14 extra commands to the Spectrum's Basic without any extra hardware. It consists of a block of machine code which is placed at address 62700 and is 2800 bytes in length.

When the code has been entered it should be saved to tape or microdrive. If you have a microdrive then you could save a short program called *run* which loads in the code after clearing space for it. (NB. It is very important that Ramtop is altered to allow space for the code or it will be corrupted.)

To activate the new commands you have to call a machine code routine at address 65285, and this all must be put at the beginning of any programs which use the extra commands.

Extra Commands

All of the commands are prefixed by an asterisk and the keyword is typed in full. In statements numeric expressions can be used to replace numbers.

Mem - Prints out the amount of memory left for programming.

Delete x,y - Deletes all Basic lines *x* and *y* inclusive.

Renum x,y - Renumbers a Basic program starting at *x* in increments of *y*.

Wash x - Changes all of the screen colours to attribute *x*.

Scroll - This statement must be followed by a single letter which indicates which direction to *Scroll* the screen in, and whether to *Scroll* by a pixel or a character. L or R for left or right; V or A for up or down. Lower case indicates pixel movement, upper case character movement.

Sound a,b,c,d - Produces a sound which can rise or fall with varying pitch and in using this it is possible to produce some respectable sound FX. *a* is the length of note, *b* is the starting pitch, *c* is the rate at which the note alters a high value causes it to alter slowly, *d* should have a value of 1 or 0. A 1 produces a rising note and 0 produces a falling note. All of the parameters should be in the range 0-255.

Exp d - produces an explosion sound, *d* is the duration and should be in the range 0-65535.

Laser - Produces a sound like a laser gun. No parameters.

Disable - Disables a break key.

Enable - Enables the break key after disable statement.

On Error Goto - After this statement an error will not cause the program to stop but a jump is made to line *n*.

On x:Goto a,b,c... Expression *x* should evaluate to an integer and then a jump is made to the *x*th line number after the Goto. (NB. In this command the Goto keyword is used.)

Call n - A call is made to a machine code routine at address *n*.

Poke x,y - This allows you to poke a 16-bit number into two addresses the first being *x*. *Goto x,y* - Goto line *x* statement *y*.

If an error occurs when a program is being run or when a line fails a syntax check, then the computer jumps to an address where the error is displayed. This address is stored in Ram in the machine stack and is pointed to by the system variable *Err Sp*. So if this address in the machine stack is altered, then when one of the new commands is encountered, instead of an error occurring the machine code routine is called and the command can be executed. If the error is not caused by one of the new commands or if there is an error in one of the other commands then the error routine is called.

If you find typing in long listings difficult (who doesn't!) then cassette copies of the program are available from me for just £1.95, at 18 Thame Park Road, Thame, Oxon.

```

10 REM HEX CHECKER
20 LET C=62700
30 FOR J=1 TO 259
40 LET Z$=""
50 FOR I=1 TO 9
60 LET X=PEEK C
70 LET W=INT (X/16)
80 LET X$=CHR$ (W*48+(7*(W>9)))
90 LET Y=X-INT (X/16)*16
100 LET X$=X$+CHR$ (Y*48+(7*(Y>9)))
110 LET Z$=Z$+X$+" "
120 LET C=C+1
130 NEXT I
140 LPRINT C1;" ";Z$ (TO 26)
150 NEXT J

```

```

15 REM HEX LOADER
20 LET C=62700
30 FOR J=1 TO 259
40 LET Z$=""
50 FOR I=1 TO 9
60 INPUT "HEX NUMBER "; LINE X
70 LET W=X$ (2)
80 LET X=(CODE W$)-48-(7*(W$>9))
90 LET Y=X$ (1)
100 LET X=X+((CODE Y$)-48-(7*(Y$>9)))*16
110 LET Z$=Z$+X$+" "
125 POKE C,X
130 NEXT I
140 PRINT C1;" ";Z$ (TO 26)
150 NEXT J

```

```

62700: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62701: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62702: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62703: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62704: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62705: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62706: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62707: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62708: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62709: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62710: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62711: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62712: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62713: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62714: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62715: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62716: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62717: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62718: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62719: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62720: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62721: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62722: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62723: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62724: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62725: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62726: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62727: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62728: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62729: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62730: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62731: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62732: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62733: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62734: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62735: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62736: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62737: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62738: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62739: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62740: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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62742: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62743: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62744: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62745: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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62748: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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62764: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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62772: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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62774: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62775: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62776: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62777: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62778: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62779: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62780: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62781: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62782: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62783: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62784: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62785: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62786: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62787: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62788: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62789: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62790: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62791: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62792: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62793: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62794: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62795: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62796: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62797: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62798: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62799: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
62800: FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

[illegible][illegible]

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Tied up with strings

Arrays and sorts de-mystified on the CPC464 by Geoff Baldwin

For many people taking their first tentative steps into the wonderful world of computer programming, the most difficult aspect to comprehend is the dimensioned array. Although at first, arrays seem complicated, they really are quite easy to understand.

The main reason for using arrays is to keep related data in a program together in one easy to manipulate block. For example, if you were writing a program to store names and addresses, it would be very difficult to handle the information if each item of data for the whole list of names and addresses were stored in the same string. It would be even more difficult to use a different string to store each name and each address.

The solution is to use one string and dimension it; for example, `Dim A$(5,2)`. This means dimension `A$` 5 x 2. What you have to do is imagine a tray, partitioned off into five sections by two sections, into which you can put information to be stored as shown in Fig 1.

From Fig 1, you will see that `A$` has been given two dimensions, if you like, a vertical dimension of five and a horizontal dimension of two. From the diagram you will also see that if we examine `A$(3,1)` this would give us "HARRY" and `A$(3,2)` gives us "CARDIFF". Each element of the array is capable of storing more than the odd word as in Fig 1. You could have a full name in `A$(3,1)` and a complete address in `A$(3,2)`. Try the program in Fig 2 out for yourself.

The next program enables you to input five names and addresses one after the other, then prints them out in the order that you input them. This is fine if you only wish to sort a few names and addresses but for a long list it would be better if the program could sort and display them either in alphabetical order either by the names or the addresses.

Sorting strings or string arrays is another area of programming that requires a little thought. Practically everybody can look at a short list of names and mentally sort them into alphabetical order, but when it comes to a long list, say 40 or more, it starts to get difficult. When you have a list of 500 or more it then becomes almost impossible to do mentally and very time consuming to do at all by hand. Tasks like this are where the computer begins to show its tremendous speed and power.

When we sort a list of names, we generally start at the top of the list and sort out the A's, then the B's, then the C's and so on, then we sort the A's into order, the word's second letter, then the third letter, etc etc. The computer on the other hand, being a totally inhuman

beast, can compare whole words, even whole sentences. When sorting words, for instance, it compares logically, looking at each word at a time and compares it with another, then decides which is the greater or lesser of the two.

The program in Fig 3 sets up a simple one dimension array, asks for 10 words or names, sorts them into alphabetical order then displays them. The way in which it does this is to compare the first word with the second, if the first word is greater than the second, the computer exchanges their respective positions in the list, then goes on to compare the second word with the third. If the third word is greater than the second, the computer will leave the words in the same positions and proceed to compare the third word with the fourth and so on to the end of the list. It then goes through the whole list to see if it's in order, if not it starts again moving words down the list

one place at a time, until the task is completed. This method is called a bubble sort. Although there are other methods this is the simplest albeit slowest method. Type in the short program and try it for yourself by typing in ten words or names. Then try typing in ten words that are very similar like Mary, Mark, Marion, Market etc, and see the results.

The next thing to try is sort a two dimension array. The program in Fig 4 does this. The first part, as in the previous listing, sets up the array and requests the inputs. The second part sorts the array. Lines 50-60 allow you to choose whether the list is sorted by Name or Address. Lines 140-150 give you the option of entering new data or re-sort the existing data.

Do have a play with the example listings given. Then see if you can write your own programs to incorporate the ideas; a proper address file or a file of your record collection perhaps.

Although the listings in this article were written for the Amstrad CPC 464, they have purposely been kept in simple Basic so that with few exceptions they can be typed into almost any machine. Have fun!

Fig 1		10 DIM A\$(5,2)			
		1	2	1	2
1	A\$(1,1)	A\$(1,2)	1	TOM	LONDON
2	A\$(2,1)	A\$(2,2)	2	DICK	LEEDS
3	A\$(3,1)	A\$(3,2)	3	HARRY	CARDIFF
4	A\$(4,1)	A\$(4,2)	4	BILL	GLASGOW
5	A\$(5,1)	A\$(5,2)	5	MARY	OXFORD

```

Fig 2
10 DIM A$(5,2)
20 FOR Y=1 TO 5
30 INPUT "NAME "; A$(Y,1); INPUT "ADDRESS "; A$(Y,2)
40 NEXT
100 FOR Y=1 TO 5
110 PRINT A$(Y,1); TAB (8); A$(Y,2)
120 NEXT

```

```

Fig 3
10 DIM A$(10)
20 FOR y=1 TO 10
30 INPUT "WORD "; A$(y)
40 NEXT
50 GOSUB 200
100 FOR y=1 TO 10
110 PRINT A$(y)
120 NEXT
130 STOP
200 y=1
210 IF A$(y) > A$(y+1) THEN b$=A$(y) ELSE 230
220 A$(y)=A$(y+1); A$(y+1)=b$
225 A$(y+1)=b$
230 y=y+1
240 IF y <= 9 THEN 210
250 GOSUB 270
260 IF FLAG=1 THEN 200 ELSE RETURN
270 FLAG=0
280 FOR v=1 TO (y-1)
290 IF A$(v) > A$(v+1) THEN FLAG=1
300 NEXT

```

Fig 4

```

10 DIM a$(5,2): DIM B$(1,2)
20 FOR v=1 TO 5
30 INPUT "NAME ";a$(Y,1):INPUT "ADDRESS ";
a$(Y,2)
40 NEXT
50 INPUT "ORDER BY NAME (1) OR ORDER BY
ADDRESS (2) PLEASE SELECT ";X
60 IF X <1 OR X>2 THEN 50
70 PRINT
80 GOSUB 190
90 FOR Y=1 TO 5
100 PRINT a$(Y,1); TAB (20);a$(Y,2)
110 NEXT
120 PRINT
130 INPUT " INPUT A NEW SET OF DATA (1) OR
RE-SORT EXISTING DATA (2) ";A
140 PRINT
150 IF A<1 OR A >2 THEN 130
160 IF A=1 THEN RUN
170 IF A=2 THEN GOTO 50
180 STOP
190 ***** SORT ROUTINE
*****
200 Y=1
210 IF a$(Y,X)>a$(Y+1,X) THEN GOTO 220
ELSE 250
220 FOR V=1 TO 2:B$(1,V)=a$(Y,V):NEXT
230 FOR V=1 TO 2:a$(Y,V)=a$(Y+1,V):NEXT
240 FOR V=1 TO 2:a$(Y+1,V)=B$(1,V):NEXT
250 Y=Y+1
260 IF Y<5 THEN GOTO 210
270 GOSUB 300
280 IF FLAG =1 THEN GOTO 190
290 RETURN
300 FLAG=0
310 FOR V=1 TO 4
320 IF a$(V,X)>a$(V+1,X) THEN FLAG=1
330 NEXT
340 RETURN

```

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Index 1984 Volume 3

General

Acorn Video, 46, 14
Activision, 38, 12
Addictive Games, 19, 13
Andromeda Software, 11, 12
Barcode, 7, 18, 8, 20, 11, 43
BBC,
DIL sockets, 6, 49
Multi-coloured graphics characters, 36, 45
Old and New commands, 13, 9
Bearcat Compuscan Scanner Radio, 12, 43
Beyond Software, 27, 12
Bulletin Boards, 20, 26
CES Show report, 3, 7, 24, 19, 25, 12
Chip Shop, 9, 13
Commodore 64,
Disc drives,
relative files, 15, 23
sequential access, 14, 36
Error recovery, 39, 41
Graphics drawing, 37, 27
Input command, 3, 31
Manual bug, 10, 7
Poke tips, 34, 40
Rom/Ram overlap, 36, 34
SID chip, 20, 34
Thief-proof programs, 13, 24
Commodore Plus/4 Rom software, 38, 22
Commodore UK, 1, 13
Communication studies, 36, 12
Compunet, 47, 14
CRL, 16, 13
Crystal Computing, 4, 13
CX3, 44, 18
Doomsday Book, 28, 12
Dragon 32,
Assembly language, 14, 28, 15, 34, 16, 27, 17, 23, 18, 29, 19, 23, 29, 32, 30, 24, 31, 28, 32, 28, 33, 28
Booting a disc, 8, 26
Break disable, 20, 47
DOS cartridge, 6, 25
Game programming, 11, 24, 12, 24, 13, 19
High resolution graphics, 26, 21
Unifile, 10, 26
User command, 9, 25
Family Leisure Centre, 6, 13
Five Ways Software, 15, 13
Fords, Dagenham, 49, 34
Gargoyle Games, 48, 12
Grenlin Graphics, 40, 12
Guild of Software Houses, 23, 14
Hughes, Stuart, 2, 13
Intergalactic Robots, 32, 12
Leisure Genius, 12, 13
Locomotive Software, 18, 12
Lynx keyboard debug, 6, 19
Mastertronic, 29, 12
Micro training programme, 43, 10
Microprocessors, 22, 13
History, 21, 12
Registers, 9, 20, 10, 18
Microradio index, 15, 51
Morse tapper routine, 1, 47
Motorola, 10, 13
MUD, 35, 12
Networking, 20, 26, 21, 19, 31, 14
Packet radio, 2, 45
Psion, 8, 12
QL,
AH and JM version, 32, 21
Listing to ZX printer, 34, 21
Merge tips, 39, 7
Microdrive program verification, 30, 23, 35, 7
Microdrive tips, 37, 23
Missing Ram, 50, 28
Psion Archive, 24, 22
Rom tabulation, 38, 30
Structured programming, 31, 21
Superbasic Rom, 21, 28, 22, 23
Superbasic tips, 37, 7
User-defined graphics, 36, 23
Quest, 48, 19
Radio frequency tuned circuits, 14, 20
Red Shift, 13, 13
Review of the year, 51, 20
SAM, 22, 13
SARUG, 24, 39
Siel, 37, 12
6802 processor, 9, 20, 10, 18
68000/68008 processors, 11, 19, 12, 19, 13, 29
Software agents, 34, 13
Software Farm, 33, 12
Software Projects, 14, 12
Spectrum,
BEEP command tips, 31, 7
Keyboard scanning, 29, 41
Large letters, 1, 53
Line 0 poke, 38, 45
Load tips, 32, 41
Machine code adventurers, 28, 20, 29, 20, 30, 31, 28, 32, 39
Microdrive Car command, 8, 24, 13, 9
Poke tips, 15, 57, 19, 7
Rem use tips, 10, 22
RS232 output port, 33, 20
Screens tip, 16, 49
System 15000, 41, 14
Tansoft, 50, 16
Topo, 7, 13
Tryptych Publishing, 30, 12
UK MSX working group, 26, 12
Vic 20,
Expander tips, 15, 57
Free command, 20, 7
Poke tips, 18, 7, 22, 41, 25, 7, 35, 45
Save tip, 18, 7
User defined graphics, 24, 49
Waite, Barry, 10, 13
WH Smiths, 17, 13
Z80 processor, 9, 20, 10, 18
Zigurat,
A changing world, 29, 51
A fab review, 29, 59

A fast buck, 31, 51
A vested interest, 1, 63
Alien logic, 49, 102
An awkward challenge, 11, 59
Bardic logic, 48, 70
Bigger and better, 4, 63
Brought to book, 20, 59
Chance confusion, 43, 70
Creative pastimes, 8, 59
Data protection, 36, 55
Dull as ditchwater, 3, 67
50 forward, 40, 70
Flatland, 34, 51
Freeware, 33, 51
Grown-up's MSX, 45, 78
Inverted snobbery, 47, 70
Is it education?, 16, 59
Kettle of fish, 2, 59
Lack of attitude, 41, 62
Mainframe power, 24, 59
Micro treatment, 44, 78
MoD discretion, 10, 55
Money talk, 23, 59
Mr Floppy comes to town, 22, 51
MSX context, 51, 78
Name of the game, 30, 51
Nightmare world, 50, 70
No excuse, 8, 59
Plug-compatible, 5, 59
Restricted supply, 9, 63
Smell, touch . . . , 38, 62
Software piracy rampant, 12, 63
Software registry, 19, 59
Strategy, 32, 51
Tacky tries, 46, 70
The lurid screen, 27, 55
The outer limits, 17, 55, 18, 59
The right question, 35, 55
The wall waggles, 26, 55
Thinking Logo, 28, 51
Ultimate goal, 14, 63
Video nasties, 13, 63
Water importance, 37, 62
What a life, 21, 55
Whizz kids, 7, 55
Worthy to note, 15, 71
Write on, Rom, 39, 70
X-ray masking, 42, 70
Colour demo, 48, 43
Scribble, 43, 35
Sound experiment, 37, 35
Aquarius
Utilities,
Machine-code animation, 1, 16
Sprite designer, 4, 18
BBC micro
Education,
Biology quiz, 50, 36
Charts, 41, 38
Cube root, 11, 41
Equations balancer, 17, 34
Equation solver, 41, 40
Heat calculations, 10, 34, 11, 28
Line of best fit, 23, 35
Moles, 44, 43
Projectile simulation, 47, 40
Ray diagrams, 19, 24
Recorder tutor, 14, 30
Time tutor, 39, 45
Games,
Balloons, 1, 10
Beetle Drive, 1, 24
Brickie, 25, 10
Cannibal Island, 40, 48
Catapilla, 43, 14
Follow, 6, 10
Horse Racing, 4, 30
Hot Drop, 8, 10
Jaws, 34, 10
Little Meanies, 20, 41
Lunar Man, 13, 29
Mastermind, 3, 32
Meteors, 27, 40
Noughts and Crosses, 25, 29
Pacman's Revenge, 37, 43
Pole Position, 14, 10
Pontoon, 6, 37
Scissors, 46, 48
Sea Attack, 9, 10
Tennis, 9, 28
Train Shuffle, 51, 12
Word Puzzle, 15, 29
Yahtzee, 38, 8
Ye Olde Castle, 17, 10
Utilities,
Animator, 1, 39
Bubble sort, 16, 20
Character designer, 29, 25, 30, 28
Cricles, 30, 37
Converter, 38, 41
Envelope designer, 33, 31, 34, 32
Epson user defined graphics, 49, 54
Filekeeper, 26, 25, 27, 31, 28, 26
Function keys, 5, 36, 7, 39
Graphic compression, 42, 39
Key bleeper, 17, 38, 20, 7
Keyword input, 46, 34
Memory, 33, 37
Multi-coloured characters, 7, 26
Shadow, 7, 37
Sorting, 7, 37
The Box, 26, 37
Word processor, 45, 56

Programs

Amstrad CPC464
Games,
Battlefields, 46, 10
Helicopter fury, 40, 14
Nellie's Anagrams, 41, 35
Pairs, 51, 48
Utilities,
Circle, 42, 52
Graphics extension, 50, 44, 51, 30
Hex converter, 50, 48
Line feed, 48, 78
Memory search, 51, 57
Microfile, 46, 40, 47, 38
Rom hex dump, 49, 64
Miscellaneous,
Animated fans, 39, 32

Index 1984 Volume 3

Miscellaneous

Beef graphics, 2, 27
 Bumble graphics, 1, 37
 Catalogue, 40, 51
 Characters, 9, 43
 Chess clock, 23, 39
 Colour blindness test, 18, 30
 Computer art, 36, 31, 37, 29
 Deep mid winter, 51, 35
 Encryption, 23, 38
 Financial calculator, 45, 46
 Graphics pad, 12, 26, 13, 26
 Kaleidoscope, 24, 30
 Meteor visibility, 35, 31
 Metronome, 15, 43
 Moving graphics, 39, 53
 Music, 5, 40
 Music procedure, 6, 30
 Origami, 29, 36
 Oscilloscope, 38, 35
 Paintbox, 31, 31, 32, 31
 Planetary movement, 22, 21
 Polar co-ordinates, 34, 31
 Programmable timer switch, 16, 29
 7 segment display, 8, 19
 Spectra, 26, 35
 Spiral, 16, 43
 Stopwatch, 1, 41
 Timetable printer, 3, 27
 Video indexer, 48, 30
 Commodore 16
 Banker, 48, 40
 Commodore 64
 Educational
 Chemistry revision, 23, 28
 Maclaurin's theorem, 38, 37
 Mathematical characters, 24, 27
 Matrix inversion, 25, 27
 Standard deviation, 13, 43
 Games
 Astro Link, 48, 10
 Deathcap, 30, 10
 Dustbin Dan, 24, 10
 Four in a row, 49, 75
 Fruity, 21, 10
 Hot Dog, 7, 31
 Land of Giants, 43, 48
 Mad Maze, 42, 16
 Pacman, 15, 10
 Skill Trap, 11, 10
 The Stow, 32, 10
 The Vortex, 17, 31
 Turbo Track, 36, 10
 Wall of Doom, 39, 10
 Utilities
 Basic auto loader, 8, 29
 Beep routine, 19, 30
 Bitmap, 13, 37
 Bootstrap writer, 13, 24
 Character editor, 41, 26
 Character generator, 31, 23
 Cursor plot routine, 46, 38
 Diss-64, 28, 31
 Easy machine code, 22, 30, 24, 7
 Envelope shaper, 5, 28
 Function keys, 38, 40
 Machine-code interpreter, 42,

44
 Machine-code monitor, 1, 28
 Memory scan, 50, 50
 Menu selection program, 34, 28, 35, 34
 Multicolour sprite generator, 29, 30
 Multiplication, 40, 39
 Parallel printer routine, 49, 49
 Resequencer, 21, 32
 Retrieve, 47, 45
 Rom/Ram data transfer, 2, 34
 Sprite creator, 10, 31
 Sprite editor, 9, 36
 Sprites, joystick moving, 4, 38
 Structured listings, 44, 40
 Windows, 32, 22, 33, 22
 Word processor, 26, 32, 27, 34
 Miscellaneous
 Clock, 26, 34
 Doodle, 39, 50
 Interrupted periodic key cipher, 30, 31
 Merry Christmas, 51, 46
 Music synthesiser, 18, 36
 Painter, 6, 26
 Psychodelia, 50, 32
 SID chip demo, 11, 30, 12, 30
 Sound effects, 45, 42
 Sounds, 12, 39
 Typewriter, 23, 38
 Dragon 32
 Games
 Ballooning, 26, 10
 Bi-Plane, 4, 10
 Dice Game, 14, 41
 Formula 2, 1, 22
 Hangman, 17, 37
 Lunar Module, 49, 16
 Meteor Storm, 2, 41
 Pontoon, 8, 39
 Rainbow Towers, 3, 23
 Santa's Present Catch, 51, 38
 Snakes, 13, 10
 Solitaire, 18, 10
 Steer, 3, 49
 Submarine Mission, 11, 37
 Tank Attack, 33, 38
 Wordgame, 5, 40
 Utilities
 Character display program, 48, 37
 Clock, 4, 26
 CPG-115 screen dump, 23, 41
 Disc file program, 5, 34
 Epson graphics dump, 20, 30
 File copy, 23, 22
 Filing program, 49, 45
 High-resolution character designer, 36, 26
 High-resolution screen dump, 38, 26
 I/O error trapping, 35, 25
 Keyboard reading routine, 7, 24
 List speed control, 28, 24
 List format, 28, 34
 Merge, 28, 41
 PMode 4 character set, 22, 26

Record screen and recall, 29, 35
 Screen to printer copy, 27, 26
 Scroll protect routine, 42, 55
 Scroll routine, 45, 49, 47, 33
 Single-key entry, 34, 25
 Sound, 40, 43
 Tandy convert, 34, 36
 Timer, 48, 44
 Title screen routine, 4, 41
 Miscellaneous
 Barchart, 46, 46
 Birthday cake, 42, 35
 Chord organ, 25, 25
 Colours, 15, 39
 Crypto, 8, 35
 Draw and print, 2, 24
 Joystick draw, 20, 40
 Message, 44, 67
 Music keyboard, 24, 24
 Rotator, 36, 39
 Starburst, 26, 38
 Stitches, 38, 39
 Typing tutor, 19, 38
 Electron
 Miscellaneous
 Absolute magnitude, 43, 38
 Dice, 4, 47
 Jupiter Ace, Loader, 9, 45
 Lynx, Attack, 2, 45
 Mamotech MTX
 Miscellaneous
 Graphics, 14, 47
 Poly tunnels, 22, 36
 Oric
 Education
 Chemistry, 16, 41
 Games
 Breakout, 14, 42
 Slide, 37, 10
 Turf Luck, 29, 10
 Utilities
 Inspector, 30, 34
 Tape loader, 40, 52
 Tape player, 41, 42
 QL
 Games
 Dragon Slayer, 45, 16
 Reptile's Revenge, 28, 10
 Utilities
 Beep command, 27, 22
 Boot program, 41, 30
 Call bug correction routine, 48, 34
 Character set, 41, 44
 Clock, 29, 23
 Disassembler, 42, 30, 43, 43
 Enhanced input routine, 49, 60
 File copy, 28, 23
 File housekeeping, 46, 26
 Graphics designer, 39, 35
 Microdrive utilities, 33, 28
 Pretty print routine, 45, 39
 Quill utility, 37, 23
 Sound editor, 48, 90
 Spectrum/QL program converter, 44, 47
 String search and replace, 40, 34

Trace utility, 35, 23
 Windows, 43, 51
 Miscellaneous
 Biorhythms, 51, 43
 Clock, 44, 53
 Spectrum
 Educational
 Correlation coefficient, 10, 37
 Elements, 26, 22
 Equation converter, 49, 42
 Function plotter, 42, 54
 Mean, median and mode, 10, 39
 Newton's laws of motion, 2, 21, 6, 7
 Newton's third law, 3, 18
 Pulley - Attwood's machine, 38, 24
 Three unknowns, 21, 37
 Games
 Air Sea Battle, 22, 10
 Alien Raid, 33, 10
 Astrocrash, 38, 10
 Bandit, 5, 10
 Bingo, 1, 31
 Chasm, 27, 10
 Cobra, 24, 39
 Communicator, 3, 45
 Cryonics Cave, 30, 34
 Delta Queen, 31, 10
 Dodgem, 11, 39
 Draughts, 3, 12
 Fighter, 39, 52
 Gang Wars, 41, 10
 Gone Fishing, 22, 23
 Gravitator, 50, 12
 In Flight, 12, 10
 Life, 34, 22, 38, 7
 Maze 'n' Chase, 5, 39
 Millipede, 4, 41
 Mine Aliens, 3, 41
 Mucroid Run, 11, 22, 12, 22, 13, 22
 Nasties, 17, 39
 Noughts and Crosses, 2, 10
 Othello, 18, 10
 Porter, 47, 10
 Quack Attack, 24, 35
 Robot, 13, 37
 Rombug, 21, 40
 Showdown, 10, 10
 Spider Attack, 45, 53
 Stunt, 6, 36
 Superman, 8, 37
 Tank Battle, 18, 10
 3D Maze, 2, 42
 Time-A-Climber, 23, 10
 Trun, 40, 53
 Z-Fred, 7, 10, 11, 7
 Utilities
 Back to Basic, 15, 43
 Basiccode lister, 8, 20
 Beeper code, 7, 21
 Bubble sort, 37, 24
 Character generator, 16, 24, 19, 7
 Clear screen, 33, 37
 Data read, 51, 57
 Display address finder, 35, 21
 Extended Basic, 19, 28, 39, 26

Index 1984 Volume 3

Fast cassette loading, 20, 28
Flash, 44, 58
Graph plot, 23, 30
Help utility, 4, 21
Input, 5, 45
Instruing function, 50, 40
Keyboard routines, 2, 19
Large letters, 4, 7
Larger screen, 43, 31
Machine code aid, 9, 42
colour, attributes, border, 1, 18
plotter, 18, 24
Microdrive loader, 48, 28
map, 42, 28
Mirror image, 5, 7
Pixel by pixel movement, 21, 22
Screen copy, 7, 36
design, 21, 39
editor/word processor, 40, 29
section save, 27, 24
Scroller, 15, 38
Scrolling, 47, 44
Seikosha GP-250X screen dump, 17, 20
64 print code, 14, 24
Smooth scrolling, 41, 29
Variable, 15, 43
Word processor, 5, 22, 17, 26
Miscellaneous
Animated loading screen, 46, 30
Balancer, 1, 47
Big draw, 28, 35
Carols, 51, 53
CB talker, 45, 36
Colour codes, 12, 37
Currency conversion, 18, 39
Days, 45, 58
Designer, 20, 39
Doodle, 44, 33
Draw, 31, 35
Energy bills, 25, 20
Floating point calculator, 6, 22
4-stroke, 14, 43
Geiger-Marsden experiment, 18, 27
Geometric, 28, 36
Graphics for the Quill, 22, 18
Logo, 19, 38
Manic Miner new titles, 18, 43
Orange, 4, 49
Organ emulator, 15, 26
Patterns, 11, 43
Popular logo plotter, 23, 7
Pie charts, 49, 80
Polaris the North Star, 3, 20
Psychiatrist, 26, 36
Radio alphabet, 26, 36
Rates, 13, 35
Reactimer, 16, 37
Revcounter, 35, 38
Sandy shore, 32, 35
Shop sign, 19, 40
Sleigh ride, 51, 29
Sound FX, 25, 35
Star navigation, 3, 20
Text editor, 24, 21

3D graphics, 37, 38
3D rotator, 9, 23
Top ten, 44, 55
Word test, 36, 24
Xmas holly, 51, 54
Vic 20
Educational
Areas, 34, 35
Matrices, 43, 53
Mean, 31, 34
Moles, 37, 39
Quadratics, 15, 38
Games
Base Attack, 50, 52
Citadel, 17, 39
Dog run, 15, 48
Falcon Fighter, 21, 35
Fred, 47, 49
Gardener, 23, 37
Grab, 44, 14
Grave Robber, 10, 38
Las Vegas, 2, 39
Letter Puzzle, 5, 43
Mastermind, 7, 35
Monkey, 1, 31
Moonlight, 4, 43
Moonlander, 27, 37
Scrap Yard, 32, 36
Shoot a Star, 29, 34
Space Sweeper, 12, 35
Space Walk, 8, 36
Stock Market, 1, 45
Sub Strike, 14, 45
UFO Attack, 47, 46
Vic Connection, 20, 10
Wipe Out, 41, 43
Utilities
AlphaSoft, 18, 40
Character drawer, 19, 37
Colour utility, 33, 36
Key bleep, 22, 35
Memory probe, 46, 44
Screen fill, 49, 72
Miscellaneous
Calendar, 48, 46
Cos graph, 15, 21
Demo, 9, 40
Hall of fame, 8, 36
Halley's comet, 20, 43
Map plotter, 15, 21
Shopping list, 42, 51
3D graphics, 16, 37
Typing practice, 42, 53
ZX81
Educational
Fractions, 24, 37
Games
Frogger, 4, 45
Fruit Machine, 16, 39
Nine Hole Golf, 6, 41
Russian Roulette, 18, 41
Triple, 3, 43
Miscellaneous
Binary, 35, 40
Program list, 5, 18
Sort, 18, 49
Strobe, 33, 37

Hardware

Acorn ABC, 39, 20
Acorn Electron Plus I Expansion Unit, 35, 14
Amstrad DDI-1 Disc Drive, 48, 14
Amstrad Micro, 16, 16
BBC EDD DFS, 35, 14
BBC Prestel Adaptor, 32, 20
Brother M-1009 job-matrix printer, 40, 17
Casio MT-200 keyboard, 27, 16
Commodore C16, 40, 20
Commodore Music Maker, 48, 15
Commodore Plus/4, 37, 16
Compunet modem, 40, 17
Concept Keyboard, 34, 15
Datafax Disc Interface, 48, 40
Echo 1 music keyboard, 42, 19
Economics Buggy, 1, 14
Ferguson TX portable colour monitor, 47, 8
Lo Profile keyboard, 38, 14
Microdrive storage box, 45, 33
Micrographic Interface MW350, 38, 14
Microsight 1, 46, 22
MSX
Canon V-20, 50, 21
Goldstar FC, 50, 21
HX-10, 44, 20
JVC HC-7, 50, 22
Mitsubishi ML F80, 50, 21
Sanyo MPC 100, 50, 21
Sony HB-75, 50, 22
Toshiba HX-10, 50, 22
Musicom ML-10 Centronics Interface, 39, 23
Oric disc drive, 19, 20
Penman plotter, 51, 14
Pison Organiser, 39, 23
QL, 3, 14, 20, 16
parallel printer interface, 26, 31
RAT controller, 36, 17
Saga 1 Emperor, 49, 40
Sakata SCP-800 plotter, 51, 14
Siel MK800, 49, 36
Sinclair flat screen TV, 13, 16
Spectrum on-off power switch, 45, 33
Spectrum Plus, 43, 19
Spectrum video adapter, 47, 8
Tatung Einstein, 42, 12
Touchmaster pad, 45, 30
Trojan light pen, 33, 15
TurboPrint/GT, 46, 22
Ultradrive, 36, 17
Wafadrive joystick adaptor lead, 41, 19
WH Smith games network, 15, 19
XP memory expansion system, 50, 18
Yamaha Y15503, 10, 14

Alien Break In, 35, 17
Alien Dropout, 24, 13
Alpha-Beth, 40, 23
American Football, 40, 25, 46, 16
Amstrad-Draw, 41, 21
Ancipital, 44, 25
Answer Back Junior Quiz, 35, 17
Aquanaut, 23, 21
Arena 3000, 32, 18
Arnold Goes To Somewhere Else, 51, 23
Astronomer, 36, 18
Athlete, 29, 17
Atom Smasher, 35, 19, 37, 21
Attack on Windscale, 23, 20
Author, 25, 17
Autocalc 64, 32, 17
Automania, 34, 19
Aviator, 33, 20
BBC Micro Utilities, 47, 17
Backtrack, 43, 75
Bandits at 3 O'clock, 22, 16
Battle for Midway, 37, 21
Battlecars, 50, 25
Bear George, 38, 20
Beebul, 48, 17
Bewarehouse, 48, 17
Black Hawk, 51, 27
Block-Buster, 34, 17
Blocker, 35, 18
Bongo, 34, 18
Borak, 24, 13
Boulder Dash, 48, 17
Boxer, 45, 24
Boxing, 41, 23
Bristles, 48, 18
Bumble Bee, 41, 21
Bumpers, 31, 17
Caesar the Cat, 30, 17
Can You Speed, 33, 18
Carnival, 26, 17
Carousell, 21, 17
Castle Assault, 46, 16
Castle of Dreams, 30, 17
Castle of Gems, 43, 27
Catastrophes, 49, 26
Caveleon, 24, 13
Character Generator, 23, 20
Chess, 25, 16
Chiller, 42, 25
Chocolate Factory, The, 28, 17
Chuckie Egg, 27, 19
Colditz, 22, 17
Colony 7, 25, 18
Complete Machine Code Tutor, 27, 18, 34, 18
Computer Scrabble, 37, 20
Constellation, 25, 16
Country Cottages, 44, 27
Crib, 31, 19
Cruce, 34, 18
Cuthbert in the Jungle, 27, 18
Cybertron Mission, 27, 19
Dallas, 22, 17
Danger Ranger, 27, 18
Darts, 26, 17
Dbug, 46, 18
Death Chase 5000, 28, 18
Dir Mille, 31, 17

Software

Admiral Graf Spee, 31, 19
Air Traffic Control, 38, 20

Index 1984 Volume 3

- Doodle, 42, 23
Doomdark? Revenge, 50, 26
Dr Watson Series - BBC Assembly Language Course, 28, 16
Dragon World, 42, 25
Drogna, 45, 26
Dune Rider, 34, 17
Eagle, 19, 21
Ebony Tower, 36, 20
Echo Art, 28, 17
Eddie Kidd Jump Challenge, 44, 28
Editor/Assembler - Version 2.1, 26, 18
Elite, 41, 22
Empires, 37, 20
Enigma, 26, 19
Eric and the Floaters, 28, 17
Estimator Racer, 50, 25
Evil Dead, The, 33, 18
Eye of Bain, 39, 16
Falcon Patrol II, 36, 20
Fall of Rome, The, 23, 21
Final Mission, The, 41, 22
Fire Rescue, 46, 17
Flip & Flop, 41, 21
Football Manager, 33, 18
Forecaster, 40, 23
Forth Compiler, 19, 21
Frac Attack, 29, 15
Frank n Stein, 36, 19
Fred, 46, 18
Freefall, 21, 16
French Revision Level, 36, 19
Fruit Machine, 51, 27
Full Throttle, 31, 18
G4IDE Microsystems Slow Scan TV program, 21, 39
Galaxy Raiders, 36, 20
Gate Crasher, 37, 22
Gauntlet, 46, 18
Gems of Stradus, 34, 18
General, Spectrum, 9, 16
Geography - Environmental Studies, 50, 25
Ghostbusters, 47, 17
Ghouls, 35, 19
Gilligan's Gold, 37, 21
Gisburn's Castle, 33, 18
Go Sprite, 30, 17
Graphics Editor, 42, 23
Graphs, 22, 17
Grasp, 45, 25
Ground Zero, 32, 18
Harrier Attack, 31, 19
Heathrow, 20, 13
Henry IV Part I, 49, 22
Hercules, 33, 19
Here and there with the Mr Men, 45, 26
Heroes of Karn, 43, 25
Hi Bouncer, 32, 17
Highway Code, 38, 20
Horace Goes Skiing, 21, 16, 29, 15
Horsehold, The, 45, 25
Hot Shoe, 47, 18
Hyperaction, 40, 24
In the Beginning, 26, 17
Interdictor Pilot, 48, 18
Jack and the Beanstalk, 49, 24
Jackpot, 31, 19
Jet Pac, 43, 26
Jet Power Pack, 23, 20
Jolly Roger, 33, 17
Joystick Art, 36, 18
Jump for your Life, 37, 22
Jungle Trouble, 27, 19
Kamakaze, 19, 12
Kensington, 45, 24
Kentilla, 42, 25
Key to Time, The, 43, 27
King Arthur's Quest, 43, 26
Kingdom of Klein, 27, 18
Knight Lore, 48, 17
Know Your Own Personality, 47, 16
Kokotoni Will, 40, 25
Laser Reflex, 32, 19
Laser Warp, 30, 16
Lazy Jones, 41, 22
Lee Flics, 27, 20
Lingo, 43, 27
MacMan's Magic Mirror, 49, 26
Macbeth, 51, 23
Mad Monty, 26, 17
Magic Micro Mission, 51, 23
Magic Roundabout, The, 46, 18
Match Point, 49, 32
Matrix, 24, 12
Megagalactic Llamas, 30, 18
Merrin, 37, 22
Message from Andromeda, 26, 19
Micro-Prolog, 15, 17
Microdrive Utility, 31, 18
Microg, 40, 24
Millionaire, 19, 20
Mined-Out, 36, 19
Mini Office, 39, 16
Missile Strike, 30, 16
Mode 80, 31, 17
Molecule, 22, 16
Moonlight Magic, 41, 21
Monsters and Magic, 23, 21
Monty Mole, 33, 19
Moons of Tantalus, 33, 17
Mr Dig, 33, 17
Mr Robot, 42, 25
Mr Wis, 30, 17
Multifile, 26, 17
Music Master, 40, 23
My First Adventure, 32, 18
New Wheels John?, 46, 18
Nightmare Maze, 40, 25
1984, 27, 20
Noah, 41, 22
Noguard 32 + Connect 4, 30, 16
Number Painter, 50, 24
Oh Mummy, 34, 19
Olympics 84, 24, 12
Operation Safras, 29, 16
Oracle's Cave, 35, 18
Orc Attack, 26, 18
Orpheus in the Underworld, 50, 24
Ossie, 28, 16
Overdrive, 48, 18
Pacman, 27, 20
Paint Pic, 34, 17
Panorama (H), 32, 19
Pascal 47, 27, 20
Payroll Plus, 50, 26
Pengi, 25, 17
Pengo, 34, 19
Percy Penguin, 49, 26
Perils of Percy Penguin, 50, 26
Photon Disassembler, 28, 18
Physics O-level Revision, 37, 21
Pi'-in'-ere, 45, 25
Pit, The, 30, 16
Pitfall, 35, 18
Pitfall II: Lost Caverns, 51, 27
Poker, 29, 17
Polly Pigeon, 47, 16
Poster Paster, 39, 17, 46, 17
Program Generator, 26, 18
Psi-Spy, 22, 17
Pyrtron, 21, 16
QL 68K Operating System, 44, 28
QL Abacus, 25, 23
QL Assembler, 46, 17, 48, 18
QL BCPFL, 47, 20
QL Forth, 50, 25
QL Lisp, 47, 20
QL Machine code Editor/Assembler, 49, 22
QL Pascal, 47, 20
QL Quill, 23, 24
Racing League, 43, 25
Random Access Mailing, 39, 16
Rapecallion, 37, 21
Readright, 29, 16
Red Meanie, 26, 18
Red Sky over Accrington, 43, 75
Report Program Generator, 26, 18
Return to Eden, 44, 24
River Raid, 42, 24
Rogue Ship, 37, 22
Room Lord, 36, 20
Rubble Trouble, 42, 24
SOS, 38, 19
Science 1, 28, 17
Scrabble, 43, 26
Screwball, 26, 16
Scuba Attack, 45, 25
Secret River, The, 47, 17
Se-Kaa of Assiah, 48, 24
Select 1, 44, 25
Shaken Not Stirred, 36, 18
Sherlock, 47, 16
Show Crazy, 49, 24
Shuttle Shock, 45, 26
Simonsoft Sprites, 32, 19
Simple Business Accounts, 37, 20
Sinbad, 39, 17
Skooldaze, 51, 27
Skramble, 24, 13
Slink, 28, 16
Slurpy, 21, 16
Smash and Grab, 36, 18, 49, 24
Snooker, 25, 17
Solar System, The, 26, 18
Son of Blagger, 40, 24
Space Commando, 32, 18
Space Pilot, 51, 24
Space Professor, 43, 26
Space Station Alpha, 35, 19
Spectrosim, 31, 18
Spectrum Assembler and Debugger, 45, 25
Spectrum Sound Effects, 35, 17
Spectrum Sprites, 26, 19
Spirit of the Stones, 44, 24
Sports Hero, 47, 16
Spy School, 35, 19
Star Avenger, 42, 23
Star Striker, 32, 17
Star Trader, 29, 16, 44, 25
Star Trooper, 27, 19
Starseeker, 35, 19
Starwatcher, 39, 16
Stock Car, 28, 18, 42, 23
Storyline, The, 28, 16
Stylograph/Mailmerge/Spell Check, 34, 17
Styx, 46, 16
Suicide Express, 40, 24
Sultans Maze, 32, 17
Summer Games, 39, 17
Supabasic, 43, 27
Superbowl, 29, 15
Supercode II, 30, 18
Tales of the Arabian Nights, 30, 17
Tank Duel, 29, 17
Tasword 464, 44, 27
The Complete Machine Code Tutor, 34, 18
3D Speed Duel, 21, 17
Titanic, 22, 16
Tower of Despair, 51, 23
Traffic, 42, 24
Trans Express, 21, 17
Trollie Wallie, 36, 19, 44, 27
Turbo, 19, 20
Turtle Jump, 34, 19
Uncle Claude, 36, 18
Underwulde, 47, 18
VIP Terminal, 49, 32
Vagan Attack, 36, 19
Valkyrie 17, 40, 23
Velnor's Lair, 38, 20
Wallie Goes to Rhymeland, 24, 12
Warpi, 44, 24
Waster, The, 33, 17
West, 33, 19
Wheeler Dealer, 22, 16
Where's my Bones, 26, 19
Witch's Cauldron, 50, 24
Wizard's Challenge, 23, 21
Wordgame, 31, 17
Wrath of Magra, 47, 16
Xanadu Cottage, 36, 20
Yacht Race, 48, 22
ZX81 Forth, 51, 16
Zany Kong Junior, 49, 26, 51, 24
Zodia, 45, 24
Zenji, 42, 24
Zeus 64, 41, 23
Zigzag, 44, 27
Zim Sala Bim, 51, 24
Index entries are listed by issue number and then page, ie, Echo Art 28, 17 is found on page 17 of issue 28.

Quantum Cassette

The one we've all been waiting for – put your QL programs on tape with **John Rainbow**

One of the unfortunate failings of the QL was once said to be its heavy reliance on microdrives, but now all that has changed, well at least if you are fortunate to own a Spectrum (48/16K) & Interface one.

This program was written through necessity, due to the high price tag on microdrives (even though they have come down) and doubts on their reliability. I like to keep only the most often used QL software on microdrive and keep all my other valuables backed up on cheap audio tapes, occasionally pulling them off tape and back to microdrive with the *QLtaper* and *Staper* programs listed here.

Inside each routine I have tried to keep to the same networking arrangements as used in earlier volumes of *Popular* so as not to confuse unduly, although there is of course nothing wrong in changing.

Down to the basics then. *Staper* is to be programmed on the Spectrum (I used the MK III version), and *QLtaper* on the QL (I have used the AH version). However, there is no guarantee that it will work on all the different combinations of the two, but it's well worth trying.

QLtaper is designed to copy Microdrive files (of about 33K in length using a 48K Spectrum) on to audio cassette tape. Moreover, if *QLtaper* has been stored on Mdv1 then it can copy itself on to audio tape. Further, for those that have Spectrum wordprocessors, then they may be able to edit Superbasic programs, ASCII Assembly listings, etc, on the Spectrum and, when ready, use *Staper* to put them back on to

Microdrive. In this way, they can save from not buying the expensive QL Editors.

Staper is designed to copy back on to the QL the Microdrive files that had been recorded on tape, or one that is still in the Spectrum's memory. (Make sure that there is a formatted microdrive in Mdv1.)

The mode of operation should be straightforward. Type in *Staper* on to the Spectrum, and *QLtaper* on to the QL and save *QLtaper* on Mdv1. A network lead (eg, the one you use for loading/saving) may then be connected between the righthand side net socket on the Spectrum and the righthand side socket of the QL. When you are satisfied that these leads are firmly in place both programs may be run: incidentally, if you forget to plug in the net leads, or if a socket/interface I is faulty, the QL will give a *Not Found* error. On a more important note, remember not to switch off any of the computers whilst data is passing between them, else you risk damage to their network interfaces!

By now, both machines will be asking questions. The answers that you give them are, of course, dependent on what you wish to do, and when answered, they will keep you informed of their progress. Three points that should be kept in mind are:

- 1) If you break into the programs whilst they are networking, remember to close the opened channels before restarting.
- 2) Although actual data transfer is surprisingly quick, opening and closing channels are surprisingly slow. Give

the QL's Microdrive a chance to stop spinning before sending it a file from the Spectrum.

- 3) Data transfer takes place in shortish bursts so there may be intervals when you think the computer has crashed. This is quite usual for larger files, it is because the network is buffered. Remember if in doubt, press *break*. . . don't pull the plug!

The first question that can be answered is the Spectrum's "Is the QL ready?", just give a 'Y' and *Enter*.

The QL may be answered next, and will instruct you what to do. First try saving *QLtaper* on to audio tape. If all is well, the Spectrum should very shortly give its *End of File* message. Continue by giving *Goto 280* and store it on tape. Now continue by sending it back to the QL's Mdv1 (remember point 2).

If the Spectrum ever gives the message *Outsized the Spectrum's Memory*, then the user should find ways to separate the large file into smaller ones that can be copied with and, when brought back, these could be recombined. In the case of Superbasic programs, this is easy. Just load the QL with the program from Microdrive and give the following as direct commands on the QL: *Net 5 (Enter), Open #6, Net.10 (Enter) List #6 line.no to line.no (Enter)* (where the line no, indicate an interval of Superbasic, see below). Finally, *Close #6*

The full Superbasic syntax of the list command (as shown on page 33 of the User guide) can be used as shown above, to create individual blocks that can be saved directly in turn on cassette.

Sorry! In last week's issue the listing for Malcolm Scorer's *Othello* program was inadvertently printed on pages 30 and 31. In addition, on page 30, the last 46 lines of the left hand column (from 00 score) and the last 10 lines of the right-hand column (from 50 For i=1..) must be deleted. Apologies for the confusion.

```

QLTAPER
100 REMARK Copyright J.D.RAINBOW
110 CLS #0
120 CLS
130 PRINT "QL TAPE RECORDER Program,"
140 PRINT "Copyright J.D. RAINBOW"
150 PRINT "REMEMBER NOT TO SWITCH OFF DURING NET"
160 PRINT "/////"
170 INPUT "Mdv1 prog. To or From tape
(T/F)? >:"WS
180 IF WS="F" OR WS="F" THEN GO TO 330
190 IF WS="T" OR WS="T" THEN GO TO 210
200 GO TO 170
210 CLS #0
220 INPUT #0;"Program Name from Mdv1's directory?"
>:"name$
230 PRINT #0,"The QL is now ready,
plug in the net."
240 PRINT #0,"Answer 'T' to the Specy's question"
250 INPUT #0,"'To or From..' Then press QL's
ENTER":HS
260 NET 5
270 OPEN_IN #6,neto_10
280 PRINT #0,"Sending:"
290 COPY "mdv1_"name$ TO neto_10
300 CLS #0
310 PRINT #0,"Job Complete"
320 GO TO 120
330 INPUT #0;"Program Name for Mdv1's directory?"
>:"name$
340 PRINT #0,"Answer 'F' to the Specy's question"
350 NET 2
360 OPEN_IN #4,neti_1
370 OPEN_NEW #5,"mdv1_"name$
380 REMARK Accessing Mdv1
390 PRINT #0,"Wait until Mdv1 has stoped spinning,
then it's ready & waiting for Specy"
400 REPEAT access
410 IF EOP(#4) THEN EXIT access
420 LET dec$=INKEY(#4)
430 IF CODE(dec$)=0 THEN GO TO 450
440 IF CODE(dec$)<>13 THEN PRINT #5, dec$;
450 END REPEAT access
460 CLOSE #4
470 CLOSE #5
480 CLS #0
490 PRINT #0,"Program "name$!"is now
on Microdrive one"
500 COPY "MDV1_"name$ TO SCR
510 GO TO 130
    
```

STAPER

```

10 REM Copyright J.D.Rainbow
20 CLS : REM Program STAPER
30 REM Just in case it's open
40 CLOSE #6
50 PRINT AT 10:13:"QL ON TAPE"
60 PRINT AT 12:11: J.D.RAINBOW"
70 PRINT AT 20:1:"IF MESSAGE""END OF FILE"
  "OCCURS,"
80 PRINT AT 21:1:"JUST GIVE A""GOTO 280"
  "DIRECTLY"
90 INPUT "Is the Q1 ready (Y/N)? >": LINE q$
100 REM Wait until ready routine
110 IF q$="Y" OR q$="n" THEN GO TO 10
120 INPUT "Program To or From Tape(T/F)?":
  LINE j$
130 REM Main Menu
140 IF j$="F" OR j$="f" THEN GO TO #20
150 REM Make enough room
160 CLEAR 32499
170 LET LO=32499
180 LET HI=PEEK 23732+256*PEEK 23733
190 LET OFFSET=3
200 FORMAT "N":10
210 OPEN #6:"N":5
220 FOR Y=LO TO HI
230 LET AS=INKEY#6
240 IF CODE AS=0 THEN GO TO 230
250 POKE Y,CODE AS
260 NEXT Y
270 PRINT "OUTSIZED THE SPECTRUM'S MEMORY!"
280 INPUT "Program Name? >": LINE n$
290 SAVE N$CODE LO+OFFSET,Y-LO

```

```

300 PRINT "VERIFYING"
310 VERIFY N$CODE LO=OFFSET
320 PRINT "CHECKING": POKE 23692,255
330 FOR C=LO=OFFSET TO Y
340 IF PEEK C=0 THEN GO TO 390
350 LET P$=CHR$ PEEK C
360 IF CODE P$=10 THEN LET P$=CHR$ 13
370 LPRINT P$:
380 NEXT C
390 INPUT "CURRENT BUFFER BACK TO QL (Y/N)?":
LINE G$
400 REM Final Verify or from tape?
410 IF G$="Y" OR G$="y" THEN GO TO 460
420 CLEAR 32499
430 INPUT "Name of program from tape? >":
LINE T$
440 LOAD T$CODE
450 LET OFFSET=3: LET LO=32499: LET Y=PEEK
23732+256*PEEK 23733: GO TO 320
460 INPUT "ATTACH NET LEAD(RIGHT HAND NETS)
THEN, WHEN QL'S READY & WAITING, PRESS THE
SPECTRUM'S ENTER: LINE R$: CLOSE #1
470 FORMAT "N":1
480 OPEN #1:"N":2
490 FOR L=32499 TO PEEK 23732+256*PEEK 23733
500 LET K=PEEK L
510 IF K=0 THEN GO TO 540
520 PRINT #1:CHR$ K
530 NEXT L
540 CLS
550 CLOSE #1
560 PRINT "JOB COMPLETE"
570 GO TO 120

```

UNBEATABLE VALUE

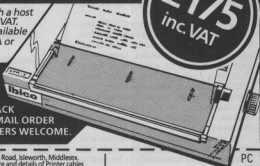
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Printing pretty

Boris Allen takes you on a whistle-stop tour of the Epson Printer in Printing Pretty

The flexibility of modern printers is well known. The most common style of printer is that derived from the Epson marque. Not only are Epson printers the most popular individual make of printer, but also dot matrix printers are increasingly providing Epson emulation modes. The key to these modes are the Epson escape sequences, which are the means by which the operation of the printers are controlled via the input channel.

Figure 1 shows a specimen of the Epson (emphasized) standard Pica font, Figure 2 shows an example of the Epson proportional font, and the final example (Figure 3) shows the proportional font with the width of the space reduced by half. The first two styles are produced by standard means, and the third style requires some redesign of the existing standard proportional font.

The standard Epson dot matrix printers have a 2K Ram buffer, which can be used to smooth the printing of text with ordinary fonts (eg Figures 1 or 2). If the buffer is de-selected (by setting Dip switch 1-4 Off) then the different standard fonts can be loaded into that portion of memory. As the fonts are now in malleable Ram, rather than stored in unchanging Rom, the shapes of the characters can be redefined.

To prepare the printer for a character set in Rom, therefore, two sequences have to be followed: first the character sets have to be loaded into the Ram; and, second, the character sets in Ram have to be selected. The sequences are known as 'escape' sequences because the first character in each sequence is the Esc character.

The ASCII code for 'Escape' is 27, and the ASCII code for '0' is 48 (ASCII is the American Standard Code for Information Interchange). ASCII codes have many applications, and for example, in Basic, Chr\$(48) is equivalent to '0' (in BBC Basic VDU 48). A further experiment is to hold down the Ctrl key whilst pressing the [key. Depending on the computer, the reaction is equivalent to pressing the Escape key.

The purpose of this short diversion is to explain the meaning of the next two lines, which are commands to be sent to the printer:

```
Lprint Chr$(27);";";Chr$(0);Chr$(0);
Chr$(0);Lprint Chr$(27);"%";Chr$(1);
Chr$(0)
```

The first line is a sequence of five characters. There are an escape (ASCII code 27), a colon (:), and three examples of the character which has an ASCII code of zero. (The ASCII character of 0, corresponds to a control code produced by Ctrl-@.) These five characters comprise

the escape sequence which loads copies of the ordinary fonts into the 2K Ram buffer.

The second line is comprised of four characters: the escape, the percentage sign (%), the ASCII character with a code of one (Ctrl-A), and the ASCII character corresponding to zero. This sequence selects the character set which has been downloaded into Ram for use by the printer. Those with access to Epson manuals should compare the above lines to the sequences given in the manuals for Esc: and Esc % 1.

I am not trying to attempt give a course of instruction in use of the Epson series of printers, and so in this section I can only give the outline of procedures of redefining characters. My task is made even easier because I am redefining the space character.

The redefinition of characters for the Epson series is accomplished by use of

the Esc and escape sequence (termed the 'download character definition' by Epson).

The lower case letter 'i' is a very narrow letter, which in the proportional font (Figure 2) is not set in space (in comparison in the word 'limited' in Figure 1, the first i is especially isolated). In the Epson documentation, the escape sequence for downloading character definitions (ESC &) is given as

```
LPrint
Chr$(27);"&";Chr$(0);Chr$(n);Chr$(m);
Chr$(a);Chr$(p1);Chr$(p2);...Chr$(p11);
where the 'p' values are numbers calculated to produce the appropriate pattern of dots to redefine the space, to half size,
LPrint Chr$(27);"&";Chr$(0);" ";Chr$(5);
For i=1 To 11:LPrint Chr$(0);:Next i
```

Between ;" and "; there are two spaces. To understand the full workings of this redefinition one needs to consult the Epson documentation.

I have provided two programs: the first uses a Microsoft style of Basic, and the other uses BBC Basic.

Whoops... in last week's issue the listings for *3 Alg's Matrices* program was inadvertently printed on pages 27 and 28.

Fig 1 The flexibility of modern printers
The most common style of print
EPSON marque. Not only are EPSON
individual make of printer, but
increasingly providing EPSON emu

Fig 3 The flexibility of modern printers is well known.
The most common style of printer is that derived
EPSON marque. Not only are EPSON printers the
individual make of printer, but also dot matrix p
increasingly providing EPSON emulation modes. I
these modes are the EPSON 'escape sequences', v

Fig 2 The flexibility of modern printers is well known.
The most common style of printer is that derived
EPSON marque. Not only are EPSON printers the
individual make of printer, but also dot matrix p
increasingly providing EPSON emulation modes. T

MICROSOFT BASIC CONTROL OF PRINTER BBC BASIC CONTROL OF PRINTER

```

10 LPRINT CHR$(27); ":"; CHR$(0); : REM download character set
CHR$(0); CHR$(0);
20 LPRINT CHR$(27); "%"; CHR$(1); : REM select downloaded character
CHR$(0) set
: REM select downloaded character
set
30 LPRINT CHR$(27); "&"; CHR$(0); : REM selection of space for
" "; CHR$(5); modification, and setting right
: REM selection of space for column to 5
modification, and setting right
40 FOR I=1 TO 11 : LPRINT
CHR$(0); :
NEXT I
: REM definition of space
50 LPRINT CHR$(27); "p"
: REM set proportional mode
60 LPRINT CHR$(12)
: REM new page
    
```

Toothers, it's an Amstrad CPC464, but to you it's



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Open Forum

We are always actively seeking programs for publication - either for Open Forum, the machine pages or Star Game. When sending in a program for consideration, a clear program listing should be sent, together with, wherever possible, a saved copy on cassette. Documentation - usually not more than 1000 words - should start with a general description of the program, what it does, and then some detail of how the program itself is constructed. We pay very competitive rates, according to the length and nature of the program and the quality of the accompanying documentation.

Balloon burster

on Dragon

The idea of this game is to burst five balloons with the point of your dart.

Full instructions are given in the program.

Program Notes

10-280 Setting up graphics
270-340 Test for keys and hit

350-390 Draw dart
400-490 Draw and move balloon
500 Balloon hit
510-560 Endings
570-600 Graphics
610-690 Instructions

```
10 POKE 65495,0
20 GOSUB 610
30 PMODE4,1:PCLS:Q=0
40 DIM A$(35),A(50),B(50),C(50),D(50),E(
50),F(50)
50 CIRCLE(10,10),10,1
60 CIRCLE(14,14),3,1
70 PAINT(10,10),1,1
80 DRAW"BM10,20F3D1G3D1F3"
90 GET(0,0)-(20,32),D,G
100 PCLS
110 DRAW"BM10,10NU10NE5NL0NG5ND10NF5NR1
0NHS"
120 GET(0,0)-(20,20),F,G
130 PCLS
140 FORX=1TO35:READ A$(X):NEXTX
150 GOTO 200
160 FORX=1TO35:FORY=1TO11:Z=MID$(A$(X),
Y,1):IF Z="0" THEN Z=0 ELSE Z=1
```

```
170 IF Z=1 THEN PSET(X,Y) ELSE PRESET(X,
Y)
180 NEXT:Y
190 RETURN
200 GOSUB 160:GET(0,0)-(35,11),A,G
210 FORX=1TO10:READ A$(X):NEXTX
220 GOSUB 160
230 GET(0,0)-(35,11),B,G
240 SCREEN1,1
250 PCLS
260 Y=Y-90
270 GOTO 400
280 IF PEEK(341)=223 THEN X=X-5
290 IF PEEK(342)=223 THEN X=X+5
300 IF X>180 THEN X=180
310 IF X<0 THEN X=0
320 IF PPOINT(39,X+5)=5 OR PPOINT(39,X+5
)=5 THEN GOSUB 500
330 IF RND(5)=1 AND Q=0 THEN GOSUB 410
```

Baud Walk



American Peoplelink

Regular readers of these columns will have read of the American Databases, *The Source* and *Compuserve* which can be accessed surprisingly cheaply via Packet Switch Stream. Just before Christmas, I was privileged to witness the birth of a new, cheaper alternative to these services: *American Peoplelink*.

Peoplelink is interesting, in that it is priced cheaper than its current rivals to the Ameri-

can *Videotex* throne. Aimed more at the 'man in the street', it costs just \$2.95 an hour to access (as compared with the 6-7 dollars an hour that *Compuserve* and *The Source* charge). Added to these charges, (for users in the UK), is the cost of PSS, or the more expensive option of direct mail, access, which works out at £8 and £37 respectively, (assuming 'cheap rate' calls).

Peoplelink is based around two Tandem mainframe computers located in Chicago. Running in parallel, they can support around 150 to 200 simultaneous users, which, although sounding very few in number, can actually service upward of 5,000 subscribers, provided, of course, they don't all log-on at the same time!

Users of *Prestel* may be interested to know that, in spite of the fact that there are currently 47,000 subscribers, only 700-800 are actually

logged on at the same time. Once these ratios are applied to *Networking*, it's easy to see why databases, such as *Peoplelink* can be started with as little as 50,000. In fact, because of provisions for expansion, *Peoplelink* cost the financiers around \$100,000 to launch. Because of the relatively low start-up costs (to them, that is), they are offering 'founder member' subscriptions for just \$15, and \$2.95 an hour connect fees.

There are surcharges for 1200 baud and peak-time usage (Monday to Friday, 9am through to 6pm), but this still keeps the rates very competitive. I understand that, until April of this year, founder members may dial direct to Chicago, and 'connect fees' are waived. If you haven't got a PSS account, and can stomach a short dialled direct Transatlantic call, then for an admission fee of \$15, it will allow you to sample the delights of American

databasing, although, at \$37 per hour direct-dial rates, PSS soon becomes a much cheaper alternative to an irate British Telecom Accounts Manager!

For more information on *American Peoplelink*, write to: Jules Millman, American People-Link, Arlington Ridge Office Centre, 3215 N. Frontage Road, Suite 1505, Arlington Heights, IL 60004, USA. Telephone 0101 312 870 5200. *Prestel* and *Telecom Gold* users may send mail to the UK collection points: *Prestel* 01 999 5800. *Telecom Gold* 84: TCC014.

Robin Wilkinson

Baud Walk is a new weekly column with news on networking, databases, reviews of modems and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to Robin Wilkinson, *Baud Walk* Popular Computing Weekly, 15-17 Little Newport Street, London WC2R 3LD. He can also be contacted on *Prestel* mailbox 019983727.

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```

340 RETURN
350 SCREEN 1:PUT(0,X)-(35,X+1),A,PSET:
FORMA=1TOS0:NEXTWA:PUT(0,X)-(35,X+1),C,
PSET
360 GOSUB 280
370 PUT(0,X)-(35,X+1),B,PSET:FORMA=1TOS
0:NEXTWA:PUT(0,X)-(35,X+1),C,PSET
380 GOSUB 280
390 RETURN
400 GOSUB 350
410 Q=1:A=235:B=RND(158):BI=-RND(10)
420 PUT(A,B)-(A+20,B+32),D,PSET
430 GOSUB 350
440 PUT(A,B)-(A+20,B+32),E,PSET
450 A=A-8
460 B=B+BI
470 IF B<0 OR B>158 THEN BI=-BI:GOTO 460
480 IF A<0 THEN S50
490 GOTO 420
500 PUT(A,B)-(A+20,B+20),F,PSET:PLAY" T10
001CDEF GAB02CDEF GAB03CDEF GAB04CDEF GAB05C
DEF GAB":PCLS:Q=0:BM=BH+1:IF BM=5 THEN 51
0 ELSE 250
510 CLS:PRINT"*****CONGRATULATIONS!!
*****"
520 PRINT"YOU BURST ALL FIVE BALLOONS!"
530 PRINT:PRINT"WANT ANOTHER GO?"
540 INPUT A$:IF A$="Y" THEN GOTO 250
550 CLS:PRINT"YOU MISSED IT!":PRINT:PRI
NT"HARD LUCK!":GOTO 530
560 GOTO 560
570 DATA 00000100000,00111111100,1111111

```

```

1111,11111111111,11111111111,11111111111
,01111111110,00111111100,00001110000,000
00100000
580 DATA 00000100000,00000100000,0000010
0000,00000100000,00000100000,00000100000
,00001110000,00001110000,00001110000,000
01110000
590 DATA 00001110000,00001110000,0000111
0000,00001110000,00001110000,00001110000
,00001110000,00001110000,00001110000,000
00100000,00000100000,00000100000,0000010
0000,00000100000,00000100000
600 DATA 00000100000,00001110000,0001111
1000,00111111100,00111111100,00011111000
,00011111000,00001110000,00001110000,000
00100000
610 PLOT 4,1:PCLS:SCREEN 1,1:CIRCLE(128,
96),80,1
620 PAINT(128,96),1,1
630 FORX=1T01000:NEXTX:PLAY"O1T255L255CC"
640 PCLS:DRAW"BM128,96NUS0ND50NLS0NR50NE
40NF40NH40NG40"
650 FORX=1T01000:NEXTX:PCLS
660 CLS:PRINTSTRING(32,"*");
670 PRINT"*****BALLOON*XBURSTER*****
**";
680 PRINTSTRING(32,"*");
690 PRINT:PRINT"YOU CONTROL A PART WITH
THE UP AND DOWN ARROW KEYS. YOU MUST
HIT FIVE BALLOONS WITH THE POINT OF YOUR
PART,AND POP THEM. IF YOU MISS ONE,
THE GAME IS OVER":RETURN

```

Book Ends



Book The Complete MSX Programmers Guide Price £14.95 Micro Any MSX Supplier Melbourne House, Castle Yard, Richmond, Surrey.

I doubt that the five-hundred plus, plastic bound pages of this book will be the standard for computer books, but the standardisation of MSX computers probably made it commercially viable.

Whether any programmer's guide can be complete is questionable, but this one certainly tries to provide a comprehensive catalogue of the tools of the MSX Basic writer's trade. It starts with a succession of short chapters, each introducing several new keywords and most ending

with an exercise or two.

Once the fundamentals have been established and practised you'll be ready to move on to the *Advanced Programming Guide*, 130 pages of Boolean Algebra, Advanced Graphic Techniques, Cartridge Slot Mechanism and more.

The second half of the book consists mainly of a reference section which makes an alphabetical journey through all the keywords with descriptions, syntax and hints. After which those with some previous knowledge of machine code will find a useful introduction to the Operating System.

All told this is an impressively - dare I say it? - complete guide to this range of micros. However, it's probably best suited to those with some programming knowledge already as the style is a

tidy dry and technical which could, I suspect, confuse the complete novice. Those who prefer the no-frills approach should find it invaluable though.

John Minson

Electronic music on the Commodore 64

Music software by Stephen M. Smith



Book Electronic Music on the Commodore 64 Price £6.95 Micro Any MSX Supplier Sunshine Books, 12-13 Little Newport Street, London WC2H 7TP.

Budding Thomas Dolbys would do well to take note of Mark Jenkins', (*Melody Maker's* technical editor) guide to the C64 and music. He writes for both programmers with little musical knowledge and budding Mo-

zarts who've outgrown their Steinways but don't know a *Peek* from a *Poke*. Both extremes of this broad spectrum would probably need some additional information, though the physics of sound is dealt with efficiently.

The book's four sections examine handling the *Sid* chip, with listings; commercial music-making software; hardware and finally the *Midi* standard of interfacing instruments and micro. This gives it a segmented appearance, but Mark Jenkins obviously knows his stuff.

While those with merely passing curiosity will probably only find the first quarter of real value, enthusiasts should find its usefulness increases in relation to their desire to experiment and tackle technicalities... and to the size of their wallets!

John Minson

Arcade Avenue



Dark Star

Paul Ledger of Leeds writes a super letter full of Pokes including a new one for Moon Alert - "Type in 10 Poke 23693,0 : cls : Load "" Screens\$: Load "" Code 24576 : Poke 42404,n : Print U\$ 26624 (where n is the number of lives - 255 gives lives). For Imagine's *Arcadia* Poke 25778,0; *Hunchback* Poke 26888,0; *Kosmic Kanga* Poke 36212,0; *Trans Am* - Break in after main block of code has loaded enter type 'Poke 25446,0 : Continue' (enter)."

Paul also sends these high scores - *Knight Lore* 48%, *Decathlon* Day 1 376,410 Day 2 294,615.

Now then all, Dragon owners sit up and pay attention. First of all comes a letter from Paul Thompson of Bracknell who has these high scores - *Hungry Horace* 100,102; *Time Bandit* 18,850; *Manic Miner* 2,200.

Paul goes on to enthuse about the game *Time Bandit*, available from Microdeal, which "has over 300 screens and is brilliant - recommended to all Dragon owners". This brings me along nicely to a letter from Mark A. Bleese of Oron Software who begins with the very true statement that "there are more and more high quality games appearing for the Dragon. That is why we are setting up the *Dragon Games Users Group*. Our aim is to cater for Dragon owners who will receive our two-monthly newsletter, *Dragon Software* which will include reviews of over 30 games as well as a page for members to exchange information and tips. Members will receive 15-20% off all software which can mean great savings. Write to Mark c/o Oron Software, 64 Prince Street, Rochdale, Lancs. OL16 8LJ.

Mr A. R. Wedge of Enfield has written in praise of the

Dragon-Design game *Dark Star*, "the best blast'em to bits game on the Spectrum". The good news is that Amstrad owners will also soon be able to enjoy this arcade masterpiece which will be some compensation for the news that the expected conversion of *Halls of the Things* has hit a snag and will be delayed. However, existing fans of Halls, and I know that there are many, will be very excited to hear that soon, perhaps by the time you read this, *Return of The Things* for the Spectrum will be in the shops. The game has a playing area of 32 times the size of Halls, includes the original tower where Halls was set within its landscape, has much nastier monsters (if that is possible).

Mr Wedge also gives these suggestions to type into the high score sheets for some unusual replies - Crystal, Tony Bridge, *Jet Set Willy*, MSX, Spectrum, sex, nothing (just press enter), spectacle,

Matthew Smith, Ultimate, help and certain other four letter words. He also sends out a plea to hackers to find the password for the mystery game on the *Dark Star* tape called *Spectacles*. This is echoed by Stuart Young of Glasgow. Well, I am reliably informed that the clues necessary to find the password are held in the *Dark Star* program, but if nobody manages to find it fairly soon the password will be released.

Tony Kendle

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Game 3 score:
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Game 2 Beach Head	Jet Pac	3D Star Strike	Splat!
Game 3 Shoot the Rapids	Chuckie Egg	Cyclone	Manic Miner

Micro Education



Glowing eyes

A few weeks ago London's Barbican Centre was home to a computer exhibition which most people probably never even noticed. Under 18's were not admitted, which was ironic because its topic was *Hi-Technology and Computers in Education*.

Of all the areas into which the micro has spread its chips, education is probably the least glamorous. Though many home computers are bought with the good inten-

tion of 'educating', most end up used for zapping. Considering the standard of some educational software this is hardly surprising.

The exhibition proved something of an eye-opener, though, in terms of the high quality of most of the educational software now being produced.

Inevitable there were almost enough turtles to fill a zoo, Logo being the language that's synonymous with programming for the young. Acorn has an implementation on two 16K Roms, Open Logo, while at the other end of the spectrum, Honeyford Software announced a disc or cassette version for the same micro for only £16. Handsomest turtle award goes to the Valiant with its see through case and glowing LED eyes.

The Teach Robot mechanical arm, with movement in six

axes, has obvious potential for class projects. Older students can also investigate computer architecture via the patchboard system of logic gate tutors by Limrose.

While all the exhibits mentioned so far are concerned with developing computer literacy and skills, the micro also has a place in teaching other subjects.

Duckworth was demonstrating a somewhat bizarre tutor for the recorder. It comes complete with the 'electronic recorder' resembling a twelve-inch ruler with sensitive pads to mark the holes; touching them generates a note which can be displayed.

One eye-catching stand belonged to Polydron, a construction system using brightly coloured, flat plastic triangles and squares to develop an understanding of 3-D geometry in the young.

Those who buy *Espionage*, an adventure game set in the oil business, may not realise that it is just part of a teaching system which also has a classroom package, and that the two interlink. This development from Modular Resources is one I hope to return to in a future column.

Finally, there are alternative ways of addressing your micro, ranging from the AMX mouse for the BBC, with its Macintosh style icons, to the Star Devices touch tablet and its overlays.

John Minson

Micro Education is an occasional column dealing with all things micro in the education world.

We would like to hear from anyone with something to say about computers in schools and education. Send your letters or details of new products to John Minson, c/o Popular Computer Weekly, 12-13 Little Newport Street, London WC2H 7TP.

Tony Bridge's Adventure Corner



Never look back

The Village Underworld is another Quill'd adventure from a new software firm, the quaintly-named Orpheus Never Look Back. On first glance, this is just another adventure, with not much about it to warrant rushing out to buy it. But look a little closer. . .

You start, standing before a village hall, beside the open boot of your car, where you must return all your treasures for scoring - but before entering, try a bit of exploring. Around the village hall lies the village, and you can wander around, mapping as you go. So far, so ordinary. But now, you come across an extensive farm, and eventually stumble across the opening to an underground maze. Fortunately, the route through the maze is posted right at the start, in the form of a very simple code (the directions being those on the cursor keys), so it is quite simple to get through.

Starting again at the first location, go on, *Open Door* and then *Enter Door*, you will be confronted with the entrance hall. Going West leads to a stage, upon which you can see some sliding controls. Go to the back of the stage and you will find a Fur Coat. Return to the stage. Now, there must be something to do with those controls - and sure enough, after some manipulating, a hole in the stage opens. This leads to a freezing Meat Factory (ah, a Fur Coat!). Proceeding further, you will eventually come across a lift. Calling the lift and then pressing the correct button will whisk you to one of six floors. One of the floors contains the solution to a puzzle contained on the floor level, another floor holds a *Treasure*, and a

couple more remain enigmas (for the moment).

This is my favourite type of game - a rather uninspiring start, full of the old clichés, gradually opening, like a lotus blossom, to reveal an inventive and imaginative test of skill. Advanced adventures will probably polish this one off in a couple of sittings, but there is still quite a lot of depth to the game, and someone looking for a bit of practice will welcome the reasonably-priced (£4.95) *Village Underworld* (written by Keith Parrock): Orpheus (Hallarch) Ltd. The Smithy, Unit 10, Church Farm Hatley St. George, Nr Sandy, Beds.

We don't often get to see adventures for younger players, and it's even rarer to come across a good one. Actually, I don't know if *Jack in Magicland*, from Turtle Software was designed as a kid's adventure, but it would certainly make a good one.

Again, it is Quill'd, and the display is what we have come to expect. Using the Quill utility, it is essential to use a bit of imagination in the layout and pace of the game, if a 'formula adventure' is to be avoided. There are many ways of doing this - I'm glad to say that Jack, while playing much like other Quill'd efforts, plays in a slightly different way.

But to set the scene. . . "You have been an idle, lazy boy and your mother was very reluctant to entrust you with so important a task" This task is to sell off the family cow - sounds familiar, doesn't it? Of course, it's *Jack and The Beanstalk* on the Spectrum.

The adventure is rather like a multiple choice test - or one of the Jackson/Livingstone 'paragraph' books. Each location boasts a screenful of text, some of which is descriptive, and some of which is atmospheric action. For example, (here, you are for one reason or another the size of a microbe):

"You see a huge lake, and as you look around a tremendous ball of water drips from a leaking tap in the far corner. It is no place for you, but as you turn to go the door behind slams shut. *You Are Trapped*. If I were you I would start swimming, because a spider the size of an octopus has just seen you! Will you *FIGHT* or *SWIM*?"

In this case, if you *SWIM*, you get sucked down the plug-hole, and if you

FIGHT, the Spider is too big for you, and you have to swim anyway, although you end up in a different place. Although there are a lot of rather tense situations in Jack, there is no overt violence, and the player almost always has a way out of trouble. In fact, the most trouble that I got into while playing the game was getting very hungry. There is a nice juicy apple, but being extremely small at this point, the problem is to somehow cut into it.

All in all, I like *Jack in Magicland*. Though I said it was for younger players (because of the scenario and this-or-that approach to the problems), the adventure is a tough one, quite hard enough for the more experienced. The locations are varied and interesting, and these and the several monsters, giants and other fair-tale characters you meet will keep you slogging away to the end. Turtle Software, 40 School Road, Finstock, Oxford OX7 3DJ.

Interceptor Micros have taken the Amstrad CPC 464 in hand, and produced a little number for it called *Jewels of Babylon*. You'll know that the machine has its own monitor, so software writers are encouraged to provide snappy graphics in their games - and JOB is no exception, having some of the nicest pictures that I've seen in an adventure. They are drawn with great style and owe a lot to the best comic art, each picture having a black frame with the occasional palm leaf draped over the frame.

I only had a few minutes at the adventure, so didn't, I assume, see more than a small number of the locations and puzzles (there weren't many of those), but several people have written to say that it is a good one. Peter Brown, for example, says that it is superb, though he can't progress much further than the beach area. You Spectrum owners will be glad to know that *Jewels of Babylon* is available for their micro - get stuck in!

Finally, let me tell you a couple of bits of news that might interest some of you. *Valkyrie 17*, the only adventure that is a total Red Herring, is now released for the Commodore 64 at £9.99.

Tower of Despair, from Games Workshop, has been causing a lot of Despair to the authors, Mike McKeown and Russell Clarke. They've been so inundated with phone calls begging for help, that they've got together and written a Help Sheet, which can be obtained if you send a SAE to Mail Order Dept., Games Workshop, 27/29 Sunbeam Rd, London NW10.

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BBC B 12 o/s Prism 1000 modem + ROM for Micronet + Prestal, various s/w £275. Tel: John 0622 679613.

BBC B + disc drive, printer, single add £80 track disc device, excellent condition, games inc Elite + Plantoid, d/cover, disc storage box. £499 o.n. Tel: 041 334 8681 after 6pm.

BBC B excellent condition, still boxed, joystick, original s/w. £210 o.n. o.n. Tel: 0185 819028 Clyde.

BBC B s/w 1.2 + Acorn DFS + 200K Teac drive + joystick + cassette, leads, £150 s/w inc Elite music system + blank discs. £320 o.n. Tel: 061 336 0897 eves.

ACORN ELECTRON + tape recorder, £690 original s/w, complete with leads etc. £170 o.n. Tel: 0742 585 377.

BBC SOFTWARE Zalaga Mr EE1 Son of Blagger, Jet Pac, Missile Base, Space Fighter, Star Striker, Galaxy Wars, C each. Wanted Ram/Rom board. Tel 0825 51076 after 5pm.

ter unit, joysticks interface, printer rolls

LARGE selection Spectrum books less than half price. Tel: 07605 402.

able. Tel: 0244 675717 for details (even
 ings, or www.bbc.co.uk)

and Commodore 2031 disc drive, £425
ono. Tel: Swindon 850470.

FUZE
 FUZED
 DEFUZED
 CONFUZED
 CONFUZIO

45

Vic 20

- (1) Perils of Willy (Software Projects)
- (2) Flight 018 (Craig Communications)
- (3) Max (Anirog)
- (4) Duck Shoot (Master Tronic)
- (5) Snooker (Visions)
- (6) Tank Commander (Thorn EMI)
- (7) Sub Commander (Thorn EMI)
- (8) Mickey the Brickie (Firebird)
- (9) X-ray Kong (Interceptor)
- (10) Jet Pac (Ultimate)

(Compiled by Websters Software)

Commodore 64

- (1) Ghostbusters (Activision)
- (2) Booby (Firebird)
- (3) Monopoly (Leisure Genius)
- (4) D. T. Decathlon (Ocean)
- (5) Kong Strikes Back (Ocean)
- (6) Scrabble (Leisure Genius)
- (7) Hunchback II (Ocean)
- (8) Fighter Pilot (Digital Integration)
- (9) Raid over Moscow (US Gold)
- (10) Chiller (Mastertronic)

(Compiled by Websters Software)

Spectrum

- (1) Booby (Firebird)
- (2) Match Day (Ocean)
- (3) Ghostbusters (Activision)
- (4) Cyclone (Vortex)
- (5) D. T. Decathlon (Ocean)
- (6) Kong Strikes Back (Ocean)
- (7) Snooker (S. Davies)
- (8) Gift from the Gods (Ocean)
- (9) Football Manager (Addictive)
- (10) Blockbusters (Mascen)

(Compiled by Websters Software)

Dragon 32

- (1) Manic Miner (Software Projects)
- (2) Dragon Chess (Oasis)
- (3) Hunchback (Ocean)
- (4) Chuckle Egg (A&F)
- (5) Scrabble (Microdeal)
- (6) Mystery of Java Star (Shard)
- (7) 'O' level Maths (Microdeal)
- (8) Cultbert in Space (Microdeal)
- (9) Advanced Basic Tutor (Ampl Soft)
- (10) Buzzard Bat (Microdeal)

(Compiled by Websters Software)

RBC B

- (1) Scrabble (Leisure Genius)
- (2) Football Manager (Addictive)
- (3) Manic Miner (Software Projects)
- (4) Frak (Aardvark)
- (5) Jet Pac (Ultimate)
- (6) Mr EE (Micropower)
- (7) Mini Office (Dainbase)
- (8) Pole Position (Rit-Tech)
- (9) Horse Lord (Century)
- (10) Sim (Visions)

(Compiled by Websters Software)

Amstrad

- (1) Zaxxon (Centrossoft)
- (2) Attack of Mutant Camels (Llanasoft)
- (3) Solo Flight (Centrossoft)
- (4) O'Reilly Mine (Centrossoft)
- (5) Encounter (Ocean)
- (6) Diamonds (EloSoft)
- (7) Gridrunner (Llanasoft)
- (8) Space Invaders (Auro)
- (9) Sleepy Jack (English)
- (10) X-ray Copper (English)

(Compiled by Websters Software)

Amstrad

- (1) Grand Prix Driver (Amasoft)
- (2) Flight Path 737 (Anirog)
- (3) Snooker (S. Davies)
- (4) Hunchback (Ocean)
- (5) Manic Miner (Software Projects)
- (6) Forest at World's End (Interceptor)
- (7) Code Name Max (Amasoft)
- (8) Football Manager (Addictive)
- (9) Monster Chase (Remik)
- (10) Admiral Graf Spey (Amasoft)

(Compiled by Websters Software)

Event	Dates	Venue	Admission	Organisers
Brisham Computer Club Show	Mar 2	Northcliffe Hotel North Petham Rd Brisham Devon	50p adults 30p children	Brisham Computer Club 080 46 89284
Second 600s Colour Show	Mar 30-31 10.00am-6.00pm	Royal Horticultural Hall Westminster, London SW1	£2.50 adults £1.50 children	Computer Marketplace 01-930 1612
Northern Computer Show	April 16-18 10.00am-4.00pm	Belle Vue Manchester	Free in advance from organisers	Reed Exhibitions 01-643 8040
Apple 85	May 9-10 10.00am-6.00pm May 11 10.00am-4.00pm	Norcross London W6	Free in advance from organisers	Database Publications 061-456 8353
Electra & BBC Micro Fair Show	May 9-11 10.00am-6.00pm May 12 10.00am-4.00pm	New Horticultural Hall London SW1	£3.00 adults £2.00 children	Database Publications 061-456 8353

Readers' Chart No 12

- (2) Knight Lore (Spectrum) Ultimate
- (1) Ghostbusters (Spectrum/C64) Activision
- (8) Underworld (Spectrum) Ultimate
- (3) Manic Miner (Spectrum/C64/Amstrad/MSX/Dragon) Software Projects
- (9) Football Manager (Spectrum/C64/BBC/Electron/Oric/Atmos/Dragon/Vic20/ZX81) Addictive Games
- (-) Elite (BBC/Electron) Acornsoft
- (7) Daley Thompson's Decathlon (Spectrum/C64) Ocean
- (-) Hunchback II (Spectrum/C64) Ocean
- (5) Pyjamarama (Spectrum/C64/Amstrad) Mikro-Gen
- (-) Match Day (Spectrum/C64) Ocean

Now voting on week 14 - £25 to win

Each week *Popular* is compiling its own special software top ten chart - compiled by YOU.

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever - but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart, published above.

You can still vote in the chart without making up a slogan - but you won't be in with a chance of winning the prize.

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to: Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

Voting for Week 14 closes at 2pm on Wednesday February 27 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name My top 3: Voting Week 14

Address 1.....

..... 2.....

..... 3.....

My phrase is:

REVISION

One of the very few items of software in the educational field to be universally acclaimed were the Penguin Shakespeare Study software programs. Now the range has additional titles, *Julius Caesar* and *Romeo and Juliet*.

Put simply what the packages do is provide a near instantaneous way of cross-referencing on the texts. For example, choosing *Romeo* as the starting point the computer would then point out significant themes in the text relating to *Romeo* and suggest cross themes which would develop ideas about and around the character.

Whilst the programming is well error trapped and efficient, the really creative part comes in the way the references are chosen and interwoven. The whole idea is necessarily selective, but that only reflects the nature of 'O' levels which are themselves heavily categorised and fixed in their range.

If you are studying 'O' level English what you have in the Penguin range is a series of programs that might be genu-

inely useful - unlike almost every other piece of software intended for education I've ever come across.

Program *Romeo and Juliet*

Price £7.95

Micro Spectrum

Supplier Penguin
Harmondsworth
Middlesex

EXPENSIVE

You may well have seen, in the months prior to Christmas, a number of ads for the Tatung Einstein micro - a strange machine with around 80K memory and a built in 3" floppy disc drive. Although it was reviewed quite favourably in *Popular*, quite honestly it has largely been forgotten since.

Well, the machine, which Tatung claims has sold around 20,000 which is not disastrous, has finally got some games software. However, the big problem with Tatung software is that like many machines the first offerings are hardly pushing the machine to its limits but they cost well over £10 a time being on disc (at least I assume that's the explanation).

I picked out *Chuckie Egg* since it is a highly regarded game, has been issued on many machines, and thus would be somewhat representative of what Tatung Einstein games would be like.

For the two people who don't know, *Chuckie Egg* is a platform and ladders game where a little egg collector leaps about, up ladders and along platforms to collect eggs. Get the lot and on you go to the next, more difficult, screen.

So, to the Einstein version. It faithfully recreates the game in every detail and graphically I'd say it falls somewhere between the Spectrum and the Commodore, ie, the sprites don't flicker and change colour but they seem a little more finely drawn than the usual Commodore efforts. The sound is very nice, the built-in speaker is pretty powerful and the volume and punchiness definitely add something.

The end result is at least as good as the Spectrum version and represents not a bad start for the machine but then you discover it costs £12.95! This tends to transform one's opinion somewhat - I realise having everything disc-based is most of the problem, but at a time when Tatung are still trying to get proper software backing for the machine, it won't do. My suggestion would be to put two games of this quality on one disc and keep the price the same.

Program *Chuckie Egg*

Price £12.95

Micro Einstein

Supplier Tatung
Stafford Park 10
Telford
Shropshire

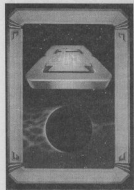
CLOCKWORK

Rumours about *Alien 8* abounded since before Christmas when the first ads appeared; 'more mega than *Knight Lore*' was the hushed claim. It's here and it's certainly amazing but, perhaps not surprisingly but still a little disappointingly, *Alien 8* is a redesigned *Knight Lore*.

It's all here; the brilliant 3D graphics, the disappearing

stairs, the crumbling blocks, things to pick up which might help you jump various obstacles and the two-tone colours.

The setting is a space ship and you play a little robot that has to wander around replac-



ing thermolex valves and activating armies of cryogenically suspended figures. The ship must be fully activated before you reach landfall, indicated by a timer.

Although solving the 3D puzzles is get through the rooms is possibly even more difficult than usual, so far I haven't found much by way of other life forms - only some clockwork mice that are animated so brilliantly they move just like... well... clockwork mice.

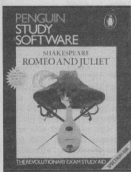
So it's *Knight Lore* again with a few extras, better graphic design and it'll sell massively. I guess given the inventive genius of *Knight Lore*, they can do it again.

Program *Alien 8*

Price £9.95

Micro Spectrum

Supplier Ultimate



This Week

Program	Type	Micro	Price	Supplier
Angelique	Ad	Amstrad	£8.50	Nemesis
Defend or Die	Arc	Amstrad	£7.95	Alligata
Battle for Midway	S	Amstrad	£9.95	PSS
Interdictor Pilot	S	Amstrad	£17.95	Supersoft
Stockmarket	S	Amstrad	£7.95	Amsoft
Music Composer	Ut	Amstrad	£9.95	Kuma
Soldier of Fortune	Arc	Atari	£7.95	English
Colossus Chess	S	Atari	£9.95	English
Arabian Nights	Arc	BBC	£6.99	Interceptor
Laser Attack	Arc	BBC	£5.00	Viking Software
Orpheus	Arc	BBC	£6.90	A + F
Whist	S	BBC	£6.45	Dotsoft

3Dtime Trek	Arc	C16	£6.95	Anirog
Flight Path 737	Arc	C16	£6.95	Anirog
Hypercircuit	Arc	C16	£6.95	Anirog
Skramble	Arc	C16	£6.95	Anirog
Star Commander	Arc	C16	£6.95	Anirog
Xargon Wars	Arc	C16	£6.99	Gremlin Graphic
Zodiac	Arc	C16	£6.95	Anirog
Berks	Arc	C16/Plus 4	£6.95	CRL
Castle of Jasoom	Ad	Commodore 64	£12.95	Commodore 64
Dungeons of Ba	Ad	Commodore 64	£12.95	Quicksilver
Gryphon	Arc	Commodore 64	£7.95	Quicksilver
Parky + Yellow Sub	Arc	Commodore 64	£6.95	Cheetah Soft
Pastfinder	Arc	Commodore 64	£9.95	Activision

New Releases

SCREEN TWO

More from US Gold, although this particular piece of gold looks a bit tarnished to me. *Congo Bongo* is a two screen game which is a mixture of *Donkey Kong*, *Qbert* and on the second screen, a 3D version of *Frogger*.

The program has a jungle/safari theme, with a little man who must be guided around dodging monkeys, coconuts, rivers etc. Screen one has the little man jumping from plateau to plateau watching for falling coconuts and monkeys and trying to reach the top-most level.

If he makes it, the game screen changes to a river in which are swimming, various jungle animals on whose backs the little man must jump to reach the other side. Fish snap, lilies shrink, rhinos rage, the graphics are all good and I was thoroughly bored by it.

Program Congo Bongo
Price £9.95
Micro Commodore 64



Supplier US Gold
Unit 10
The Parkway
Industrial Centre
Birmingham

GO WEST

Go is a Japanese game of strategy that is a national sport in the home country and has many devoted followers here. Like many of the classic games, Go is essentially simple but can be played to an astonishing level of skill and complexity.

Microgo 1 was first implemented on the BBC after winning a competition to find the best computer Go player. A version is now available for the Commodore 64.

Quite apart from the skill of the computer player and the quality of the graphics this program has a virtue which many other game implementations lack - it'll show you how to play the game properly. A beginners mode allows you to play a game with running commentary on the current state of play and on screen annotations of the dangerous areas - the key element of Go is one of territory capture and the program will reveal vulnerable board positions.

All in all if you like Go then you'll simply have to buy the program. If you've never heard of it, but enjoy computerised board games, buy it anyway on the off chance.

Program Microgo 1
Price £9.95
Micro Commodore 64
Supplier Edge Computers,
3 Junction Road,
Reading,
Berks RG1 5SA.

Pick of the week

CUT AND THRUST

One of the most inventive and humorous arcade games ever must be *Spy vs Spy* for the Commodore 64. It is also one of the very few spin-offs that really captures some of the flavour of the original - in this case the famous Mad cartoons featuring two spys - one black, one white - whose viciousness, ruthlessness and total devotion to each other's destruction reveals them to be brothers under the skin (well, hat and coat actually).

The screen is divided into two sections, each giving an edge-on, 3D perspective view of the room currently occupied by each spy. As the spy moves so the room changes. In each room are hidden objects which each spy requires such as Briefcase, Passport, etc, and these must be found and collected - finding them all enables an escape to be made.

However, the really amazing part of the game is the way each spy can lay a number of traps for the other; bombs, trip wires, lethal buckets of water, etc. These are positioned using the joystick. The knack then becomes to watch what the other spy is doing so that you know where his traps are laid and



can disarm them. It is worth remembering where your own traps are placed lest you commit Hari-Kari. This turns the game into a kind of manic strategy game.

Whilst you can play against the computer quite satisfactorily, the best comes with a human opponent as you both try to outwit one another - a laugh a minute.

Program Spy vs Spy
Price £9.95
Micro Commodore
Supplier Beyond
Farndon Road
Market
Harborough
Leics LE16 9NR

FLOWER SHOW

Macmillan, whose educational software released with Sinclair has been, in the past, one of the few bright spots in an incredibly dull educational software horizon, has re-

leased six new programs.

Previous Macmillan software has taken the bold step of providing material for the 12+ age range - it was very successful indeed. With programs like *Glider*, educational material was provided for a more sophisticated age range

This Week

Here + There Mr Men	Ed	Commodore 64	£7.95	Mirrorsoft
Hi Bouncer	Ed	Commodore 64	£6.95	Mirrorsoft
Star Seeker	Ed	Commodore 64	£6.95	Mirrorsoft
Word Games Mr Men	Ed	Commodore 64	£7.95	Mirrorsoft
Murder on the Zind	S	Commodore 64	£11.95	Ariolasoft
Screaming Abdabs	Arc	Dragon	£6.90	A + F
Snowman	Arc	MSX	£7.95	Quicksilver
Deep Sea	Arc	Spectrum	£3.00	Falcon
Alpha Beth	Ed	Spectrum	£9.90	A + F
Castles and Clowns	Ed	Spectrum	£5.95	Macmillan
Julius Caesar	Ed	Spectrum	£7.95	Penguin
Quiztimer	Ed	Spectrum	£5.95	Macmillan
Romeo and Juliet	Ed	Spectrum	£7.95	Penguin

Snapple Hopper	Ed	Spectrum	£5.95	Macmillan
Space Scan	Ed	Spectrum	£5.95	Macmillan
Sunflower Number Show	Ed	Spectrum	£5.95	Macmillan
Tops and Tails	Ed	Spectrum	£5.95	Macmillan
Turntaking	Ed	Spectrum	£5.95	Learning Process
Psychodelia	Ut	Spectrum	£6.00	Llamasoft
Spectrum Graph Machine	Ut	Spectrum	£13.95	McGraw Hill

Key: Ad - adventure. S - strategy-simulation
Arc - arcade. Ut - Utility
Ed - education.

that was actually useful.

Most other companies had concentrated on earlier age ranges and had made a hash of this. The new Macmillan software is for the earlier age ranges and it's interesting to see how the company has tackled this area.

The *Sunflower Number Show* uses, like most other educational software, the dubious drill and routine method of firing question after question and noting right and wrong answers graphically. The questions are all on maths and the theme is one of making plants grow, ie, right answers add another leaf, wrong ones bring a nasty looking weevil or poison ivy that bit closer.

However, this program has a major virtue over others which are superficially similar - it is beautifully and expertly programmed. The idea that educational software

effects, eg, when you successfully 'grow' a flower it blooms pleasingly and a little bird flies across the screen and lands on the words 'well done' chirping enthusiastically. The animation of the bird is excellent; even the beak moves and it is this kind of detail that is going to make a child want to continue with the program.

The above, coupled with the fact that there are many different variations on the theme of plants growing, makes this program light years ahead of most other, apparently similar, offerings. What's true of this program appears to be true of all the other programs in the series and no fraudulent beefed-up price because it's 'serious' either.

Other educational software companies take note.

Program *The Sunflower Number Show*
Price £5.95
Micro Spectrum
Supplier Macmillan
 4 Little Essex Street
 London WC2R 3LF

THINGIES

Activision, still flushed with the success of *Ghostbusters*, is shortly to issue a new Commodore title, *Pastfinder*, which, whilst unlikely to reach *Ghostbusters*' level of fame, is nevertheless an excellent program.

While it's a fairly straight arcade game, in that you need lots of quick reaction to dodge things, hit things, collect things, there are a number of features that lift it well beyond the run of the mill.



The viewpoint is one I have rarely seen before. You look down on the action but from slightly behind the scenes. The plot involves moving your well, spaceship it's not, so so let's call it a thingy and have done with it, through a strange landscape - a map option gives you some idea of where you are and where else you can go. There are objects to be collected, places to refuel your thingy and, if you're lucky extra thingies to be found.

I won't describe the whole plot, but it has a lot to do with ancient civilisations and radiation.

Pastfinder is well worth buying, but while any other company would be putting this out for £7.95 or even £8.95, the Activision price is £9.95. It is too much and detracts from a highly recommendable game.

Program *Pastfinder*
Price £9.95
Micro Commodore 64
Supplier Activision
 15 Harley House
 Marylebone Road
 London NW1 5HE

MINTER MAGIC

About *Psychodelia* a lot has been said already. As a program it has probably done more for the sales of early Pink Floyd records than LSD, OZ or Afghan coats ever did. Described by Jeff Minter as a Light Synthesizer (and that is as good a term as any) basically you get to create amazing flowing geometrical bursts of colour on your computer using the joystick.

The news that a version of the program was going to become available on the Spectrum was greeted by me with trepidation; yucky blotches of sickly colours where attributes clashed wildly, smeared of ugly hues mingling like tomato ketchup and egg yoke in a sickly mess.

But no! It doesn't happen! Except for the reduced number of colours, the Spectrum version of *Psychodelia* is in no way inferior to the Commodore version and so can be recommended to space cadets everywhere.

Program *Psychodelia*
Price £6.00
Micro Spectrum
Supplier Llamasoft
 49 Mount Pleasant
 Tadley
 Hants

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



requires as deft a programming touch as the latest megagame is an important one.

The *Sunflower Number Show* uses smooth scrolling and sprites for its graphic

A + F, Unit 8 Canal Side Indust Estat, Woodbine St East, Rochdale, Lancs LL16 5LB. 0706 341111. **Activision**, 15 Harley House, Marylebone Road, London NW1. 01-486 7588. **Alligata**, 1 Orange Street, Sheffield S1 4DW. 0742 755796. **Amsoft**, Brentwood House, 169 Kings Road, Brentwood, Essex. 0277 230222. **Anirog**, Victoria Industrial Park, Victoria Road, Dartford, Kent DA1 5AJ. 0322 92513. **Ariolasoft**, Retail CRL, CRL House, 9 Kings Yard, Carpenter's Road, London E15 2HD. 01-533 2918. **Cheetah Soft**, 24 Ray Street, London EC1R 3DJ. 01-833 4909. **Dotsol**, PO Box 46, Hitchin, Herts SG4 0XQ. **English**, Box 43, Manchester M60 3AD. 061 835 1358. **Falcon**, C/O Dept 1-8 Wittering Walk, Hornchurch, Essex RM12 6NS. **Gremlin Graphic**, Alpha House, 10 Carver Street, Sheffield S1 4FS. 0742 753423. **Interceptor**, Interceptor Micro's, London House, The Green, Tadley Hampshire. 07356 71145. **Kuma**, Kuma Computers, 12 Horseshoe Park,

Pangbourne RG8 7JW. 07357 4335. **Learning Process**, 38 Homedale House, 3 Brunswick Road, Sutton SM1 4DG. **Llamasoft**, 49 Mount Pleasant, Tadley, Hants. 073 564478. **Macmillan**, Macmillan Information Systems, 4 Little Essex Street, London WC2R 3LF. 01-836 6633. **McGraw Hill**, McGraw Hill Book Company, Maidenhead, Berks. **Mirrorsoft**, Mirror Group, Holborn Circus, London EC1P 1DQ. 01-353 0246. **Nemesia**, 10 Carlow Road, Ringstead, Kettering, Northants NN14 4DW. **PSS**, 452 Stony Stanton Road, Coventry CV6 5DQ. 0203 667556. **Penguin**, 536 King's Road, London SW10 0BR. 01-759 1984. **Quicksilver**, Palmerston Park House, 13 Palmerston Road, Southampton, Hampshire SO1 1LL. 0703 20169. **Supersoft**, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. 01-861 1166. **Viking Software**, 58 Central Avenue, Syston, Leicester LE7 8EE.

This Week



Immense power

What next, after the silicon chip? The laser computer? Two things limit the power of conventional computers – the maximum size of components (on chip transistors principally) that can be built and, secondly, how fast the chips can be made to work.

Silicon components still have a long way to go before reaching their limit of size and speed, but nothing can be done to alter their inherent slowness. This is a result of the finite speed of which electrons travel through a semiconductor. A typical switching speed or an on-chip transistor is somewhere around 50 millionth of a second.

Now, however, a team of scientists at Herriot Watt university in Edinburgh – with a radical new approach – have succeeded in decreasing this operation by a factor of 20,000. Not by discovering some faster semiconductor, but by a completely new idea that could revolutionise the computer.

Ever since the valve machines of the 1950's we have tended to consider computers as intrinsically electronic devices. Why should they be? Computers consist of a large number of simple decision making elements such as *And* and *Or* gates which, up until now, have been constructed from electronic switching transistors. The Herriot Watt team, however, have created an *optical* equivalent of the transistor using super-fast laser light rather than electricity.

This 'transphaser', as it is known consists of an ultra-thin crystal whose faces have been given a mirror finish. Laser light striking the first face of the crystal is initially prevented from passing through. However, when a second, far

less powerful 'modulating' laser beam is also aimed at the face, the slightly greater power causes the crystal to change its properties and the laser light passes through virtually unhindered. It is then relatively simple to adjust the optical transistor principle to create such devices as *Or* gates directly, rather than from a group of transistors.

Micro-electronic components require extremely complicated manufacturing techniques to make them as small as they are. Optical devices, however, are little more complex to make than a common mirror and the size of each component is determined only by how accurately the laser beam can be focused.

Conventional electronic devices are dedicated to one task only (say an *And* gate). Not so optical ones, they can change their identity depending only on the relative powers of the two beams fed into them.

Finally, beams of electrons in a silicon chip travelling close to each other can interact, which means that the signals in electronic circuits must be fed along conducting, insulated wires. Laser light beams, on the other hand, do not interact however close they are.

Such a 'transphaser' offers, also, the near ideal properties for parallel processing. Not, that is, the 'gross' kind used by today's super-computers, where fairly large chunks of a problem are allocated to individual processors. Instead 'true' parallel processing could be possible, where a single signal can be operated on simultaneously by many gates and where each gate can communicate with a multitude of others. Something like the way the human brain works!

Transphasors, with their super-fast speed and parallel processing possibilities, offer the promise – albeit some way in the future – of computers with immense power.

However, the devices are still in their experimental phase of development. Not least amongst the problems is the design of a completely new computer logic and architecture. . .

Glen Counsell

Every alternative

Puzzle No 146

The ornamental lake at Burlingham Hall is rectangular in shape.

"The length and breadth are each an exact number of yards," explained the 14th baronet to his weekend houseguests, "as are the diagonals across the lake."

As the party was kept indoors due to particularly wet weather, it was proposed that, given the above information and the fact that the width was 144 yards, each guest should try to determine the size of the lake.

Unfortunately, there is more than one possible answer from the data given, and each guest came forward with a different possibility.

How many guests were there at Burlingham Hall if, between them, they accounted for every possible alternative.

Solution to Puzzle No 141

Thirteen deals are needed with a standard pack. If four extra cards are added then 18 deals are required.

```
10 DIM CARD(52)
20 DIM DEAL(4,13)
30 K=1
40 FOR N=1 TO 52
50 CARD(N)=N
60 NEXT N
70 C=1
80 FOR N=13 TO 1 STEP -1
90 FOR M=1 TO 4
100 DEAL(M,N)=CARD(C)
110 C=C+1
120 NEXT M
130 NEXT N
140 FOR N=1 TO 4
150 FOR M=1 TO 13
160 CARD(N)=(M-1)*(13+N)+DEAL(M,N)
170 NEXT N
180 NEXT M
190 FOR P=1 TO 52
200 IF CARD(P)<P THEN 240
210 NEXT P
220 PRINT "PACK IS RESTORED AFTER 'J.K.' DEALS"
230 END
240 K=K+1
250 GOTO 70
```

The program sets up two arrays – one to record the order of the cards, and the other as they are dealt out. The cards are numbered from 1 to 52 and their relative positions can be checked as their order in the pack alters. Remember that the first card dealt in the first deal will be the 13th card dealt in the second.

Winner of Puzzle 141

The winner of Puzzle 141 is Dr P S Story of Rochester, Kent who receives £10.

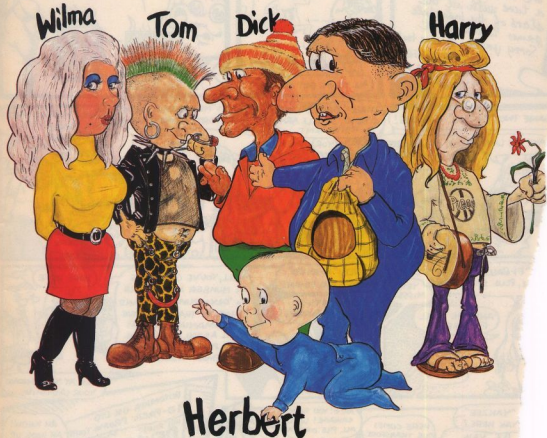
Rules

The closing date for Puzzle No 146 is March 8.

The Hackers



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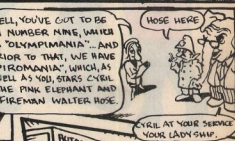
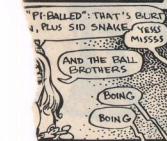
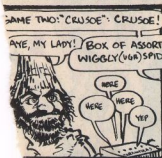
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